

तमसो मा ज्योतिर्गमय

SANTINIKETAN
VISWABHARATI
LIBRARY

D. B
374.8
= B 441 E

Education for Industrialization

An Analysis of the Forty Years' Work of JADAVPUR COLLEGE OF ENGINEERING AND TECHNOLOGY (1905-45)

BY

BENOV KUMAR SARKAR, M.A., *Vidyavaibhava*, Dr. h.c.

Post-Graduate Department in Economics, Calcutta University; Hon. Professor of Economics and sometime Rector, College of Engineering and Technology, Jadavpur, Calcutta; Member, *Société d'Economie Politique* (Paris), Royal Economic Society (London), *Hobbes-Gesellschaft* (Kiel), *Institut Oriental* (Prague), *Comitato Italiano sulla Popolazione* (Rome), *Institut International de Sociologie* (Paris), *Ekonomia Orientalisyczna* (Warsaw), Royal Asiatic Society (North China Branch, Shanghai), Editor, *Arthik Unnati* (Economic Progress)

CHUCKERVERTY CHATTERJEE & CO., LTD.
BOOKSELLERS & PUBLISHERS
15, COLLEGE SQUARE, CALCUTTA.

1946

Rupees Fifteen

Published by
R. C. Chakrabarty, M.Sc.
Chuckerty Chatterjee & Co., Ltd.
15, College Square, Calcutta.

Printed by
J. C. Sarkhel at the
Calcutta Oriental Press, Ltd.
9, Panchanan Ghose Lane,
Calcutta.

TO

SATIS CHANDRA MUKERJEE,

FOUNDER OF THE DAWN SOCIETY (1902-6),

embodiment of selfless devotion to the country's cause and apostle of the *Swadeshi* movement in all its phases, whose creative imagination and organizing ability were mainly responsible for the steps and activities which have led forward to what is today the College of Engineering and Technology at Jadavpur as an instrument of industrialization, economic modernization and socio-cultural transformation

This book is dedicated by one of his humble admirers,

The Author.

PREFACE

I

The present publication has arisen out of a request from the Executive Committee of the National Council of Education, Bengal, communicated to me on June 2, 1945, by the Hon. Secretary, Advocate Satyananda Bose. In order to collect data I placed a questionnaire with the Principal, Dr. Triguna Sen, Dr. Ing. (Munich), of the College of Engineering and Technology at Jadavpur, and requested him to kindly circulate it among the members of the teaching staff as well as those of the Alumni Association and other persons interested in the "national education" movement.

The questionnaire was formulated as follows:

"Confidential Statements by Old Boys and Teachers of the National Council of Education (College of Engineering and Technology, Jadavpur) Bengal

A. Name, Home District, Birth Year, B. Pre-N.C.E. Schooling, C. Period of Studies under the N.C.E., D. Subject Studied, E. Subsequent academic studies in India or abroad, F. How far the N.C.E. schooling may be regarded as useful in your present work, G. Shortcomings of the N.C.E. schooling as they appeared to you during your academic career, H. Present Occupation: (1) Your designation and status. (2) Output and value of work done in the firm. (3) Number of employees in the firm. (4) Capital. (5) The year of establishment of the firm. I. Suggestions for improving the N.C.E. schooling on the strength of your life's experience."

In the first week of July an informal conversazione was arranged with the teaching personnel in the College premises, and it was possible for me to exchange views. On several occasions I paid visits to the Laboratories and Workshops under the guidance of Professors Hem Guha, B. Sc. (Edin.), G.I.E.E. (London), Manmatha Chakravarti, B.Sc. (Cal.), B.S. (Worcester), M. S. (Purdue), Drs, Satish Bhattacharya, M. Sc. (Cal.), Dr. Ing. (Berlin), Jatin Bose, Dr. Ing. (Berlin), and Hiralal Roy, A.B. (Harvard), Dr. Ing. (Berlin), as well as Banesvar Dass, B.S.Ch.E,

(Illinois),—all of whom happen to be “Old Boys” (Alumni) of the National Council of Education. For these visits I used to take as my “Hony. Consulting Engineer,” Promod Chatterjee, B.Sc. Eng. (Benares), Superintendent, Motor Vehicles Department of Calcutta Corporation, who has placed his engineering knowledge at my disposal in a friendly manner in various connections. It is superfluous to observe that in regard to the most elementary items of engineering and technology I am in need of a guide, philosopher and friend. At the same time I established contacts with the members of the Alumni Association as well as others in industry and business and drew upon their experience.

A number of responses to the questionnaire have reached me from far and near. They are substantial and I am indebted to all those Jadavpurians who have taken the trouble of offering me this friendly co-operation. Every one of the replies has been utilized in this study in considerable proportions.

About the N.C.E. there are not many publications. The *Annual Reports* are virtually the sole sources of information in print. The *Journal* of the Jadavpur College published a special number in 1938 dealing with the history of the N.C.E. in all its aspects. It is a valuable record and,—uptodatized,—ought to be available as an independent book. In my *Creative India* (Lahore, 1937) there is a section dealing with the N.C.E. in connection with the position in India of “Education and Research in Science.”

The present survey is chiefly analytical. Although historical it does not deal much with the past. I am devoting more thought and time as well as space to the present than to the by-gones. This is manifest in the attention that is being bestowed on 1945 and even the few weeks of 1946. Nay, I am interested more in tomorrow and day after tomorrow than in today. My obsession is futuristic. No antiquarian or archaeological bias can be expected in such an analysis.

II

Engineering and technology are growing sciences. Theirs is the call of “Futureward Ho!” Even “senior” professors are likely to be relatively less competent. The teaching staff of

Jadavpur College has therefore been a growing one both in number as well as in the quality and variety of attainments. There are at present 76 persons on the staff, ten per cent being honorary or part-time. Eighteen professors possess American, British, German and French University as well as factory experience. Five of them are Doctors of Engineering or Science. During the last few months a junior member of the teaching personnel has been sent to the Imperial College of Science and Engineering (London) for doctorate. Another is bound for the United States but is being held up on account of transportation difficulties. The teaching corps has been slowly getting rejuvenated.

As a member of the Association of Principals of Technical Colleges Dr. Triguna Sen attended in 1945 several meetings of the Conference sponsored by the Government of India in order to introduce rationalization and uniformity in the syllabuses. In response to the Government of India's invitation Dr. Hiralal Roy also has taken part in the All-India deliberations in regard to the study of chemical engineering in technical schools. The experiences of Professor Banesvar Dass in chemical industry have often been drawn upon by Calcutta Corporation and Bengal National Chamber of Commerce.

There is no special provision for research under the N. C. E. But the original contributions of Professor Satis Chakravarti M.Sc. to mathematics for over twenty years are well known in India and abroad. The researches of Professor Banesvar Dass in the field of oil-chemistry have attracted the attention of industrialists in Bengal and beyond. Some of the designs of Professor Jatin Bose have been announced in the Reports of the N. C. E. Professor Hiralal Roy's papers have been published in American as well as Indian Chemical Journals. The work of Dr. Shib Deb, Dr. es Sc. (Paris), in geology and mining is getting known. As a participant in the Historical Records Conferences Lecturer Shiva Sen B. A. Hons. (London) has produced useful papers some of which are being published by Calcutta University. Finally, it is relevant to add that some of the Professors of Jadavpur College function as paper-setters and examiners at many Universities and Engineering Colleges in diverse parts of India from Andhra to Baroda.

The Alumni (Old Boys) Association of the National Council of Education is going to celebrate its Silver Jubilee before the next convocation is held. These Old Boys have rendered valuable service to Jadavpur College by creating the interest of Calcutta Corporation and by enlisting donors and supporters in its cause. A travelling fellowship has been provided by them to a junior member of the teaching staff for doctoring and "factorification" in the U. S. A.

In the premature death of Kiron Roy, B.S. (M.I.T. Boston) in October 1945, one of the alumni, India has lost a genuine patriot, a modern-spirited electrical engineer and an energetic businessman of substantial importance.

Another great Jadavpurian was Professor Naren Sen-Gupta, Ph. D. (Harvard), the pioneer of Experimental Psychology in India, who died at Lucknow in 1944 at the age of 55. He was one of the seniormost alumni of the National Council.

From among the most successful scholars of Jadavpur two have been recently granted the Government of India scholarship and one the Bengal Government scholarship for prosecuting higher electrical and chemical engineering studies in London. The authorities of the Govindram Watumull Foundation of Honolulu and Los Angeles (California) have awarded a travelling fellowship to one of the Instructors of Jadavpur for higher education in the U. S. A. All Indians are proud of the patriotic work that is being done by this Indian (Sindhi) Foundation in America in the interest of India's education and industrialization. Incidentally it may be observed that Dr. Tarak Das of New York has been a friend of N. C. E. scholars in the U. S. A. and other foreign countries for a long time.

Messrs. Tata Iron and Steel Co., Bengal Steel Corporation, Burn & Co., Jessop Co., Jay Engineering Works, Calcutta Electric Supply Corporation, Siemens (India) Ltd., Kesoram Cotton Mills, Mohini Mills, Telegraph Workshops, Jadavpur Soap Works, Calcutta Chemical Co., National Soap Works, Andhra Paper Mills and other industrial concerns have agreed to accord to the students of Jadavpur College facilities for work as apprentices while still in tuition. Professors of the Mechanical, Electrical and Chemical Engineering Departments carried on negotiations with the representatives of these factories and workshops.

This patriotic service on the part of the teachers is noteworthy. It is an inspiration to the 1250 students on the rolls.

Imperial College of Science and Technology (London) has accepted a Jadavpur scholar for post-graduate studies. The N. C. E.'s honours graduates have likewise been recognized by the Massachusetts Institute of Technology (Boston), the University of Michigan, the Carnegie Institute of Technology (Pittsburg), and Cornell University (Ithaca, New York) as qualified enough to join their post-graduate classes (known as "Graduate Schools" in the U.S.A.).

Jadavpur College, as it has evolved during forty years, is by all means to be treated as an "Indian M. I. T.", i. e., a Massachusetts Institute of Technology adapted to Indian conditions. It is certainly capable of further progress along many lines in the interest of heightened efficiency. This is likely to be promoted on the strength of substantial grants,—both recurring and capital,—expected from the Government in the near future. Such grants have long been overdue. But on the other hand, the progress-mindedness of Calcutta Corporation is manifest in the financial co-operation annually extended to Jadavpur College since 1927.

It is worth while to record that some engineers of the U.S. Army stationed in Calcutta have been interested enough to visit Jadavpur College and come into social intercourse with the Professors. The College has been visited likewise by American journalists as well as members of "other ranks" and the Consular Service. The Principal and other Professors have contacted the American Liquidation Authorities at New Delhi and Calcutta and have succeeded in obtaining some of their machineries.

Not less constructive and valuable has been the exchange of ideas with men like Lt. Col. E. F. Gerold of the U. S. Armed Forces Institute, Cols. B. L. Gordon, C. L. Leedham and H. S. McConkie of the American Base Hospital, and Lt. Cols. O. M. Jernigan, A. Mayer, R. Eberlin, and W. R. Ziegler, Majors F. Schleicher and J. J. Brown and others of the U.S. Engineer Corps. This has enabled Jadavpurians to get realistic views of American scientific, engineering and cultural methods.

PREFACE

III

It has been my endeavour to exhibit the activities of the N. C. E. and Jadavpur College in as few realistic backgrounds as possible. But the subject deserves a detailed and an extensive study. For, Jadavpur College is the embodiment of Nationalist India, its grand ambitions, its colossal energies, its struggles against Himalayan obstacles, and its successes, howsoever modest, in the midst of disappointments and failures. The country expects that the N. C. E. will consider it worth while to get a somewhat full-blooded and meaty publication prepared about such a soul-inspiring theme of creative nationalism. The constructive efforts of the fathers of the "national education" movement and of their successors down to the youngest members of the Alumni Association have need to be surveyed and analyzed in an elaborate manner on the strength of biographical data and personal reminiscences. The present work is but a dry snapshotty account of the barest incidents in the history of the N. C. E. as interpreted in the perspective of industrialism and technocracy. But this short study may not fail to inspire businessmen, educators, industrial leaders, culture-promoters and philanthropists to come forward to initiate a number of new Jadavpur Colleges in diverse centres of India. And it may also furnish them with a drive in order to develop the longed-for Greater Jadavpur under the auspices of the National Council of Education.

The infant National Council of Education was the theme of my very first writing. It was on 31 July 1906 that I published "Why it is the Duty of Every Student of Bengal to join the N.C.E." in the *Amrita Bazar Patrika*,* then edited by Motilal Ghosh. This was two weeks before the formal inauguration of Bengal National College, the predecessor of the present Jadavpur College, on 14 August 1906 (p. 44). Since then every one of my literary contributions in India and abroad has had direct or indirect associations with the N.C.E. It is interesting that even after forty years the work that is being sent forth today has for its fundamental theme the ways and means for the expansion of the N.C.E. in the pattern of Greater Jadavpur.

* The paper may be seen as "National Education and the Bengali Nation" in *The Social and Economic Ideas of Benoy Sarkar* edited by Baneswar Dass (Calcutta 1940), pp. 455-462.

An examination of the list of donors and donations (pp. 339-345) will indicate that in recent years (1930-45) the N. C. E. has failed to attract financial support from zamindars (landowners) and lawyers, the chief patrons of the "national education" movement in the pioneering stages. The attention of our go-ahead publicist and social worker, Dr. Bidhan Roy, the present President of the N. C. E., is being hereby directed to the problem of tapping these traditional sources of Indian nationalist finance and patriotism. The young zamindars, Snehanu Acharya, Bar-at-law, and Biren Roy-Chowdhury, music master and connoisseur, can likewise make it a point to revive the interest of the landed bourgeoisie and the Barristocracy in the fortunes of this great although poor institute of technocracy and economic modernization.

Then, again, Gujarati, Marwari, Parsi and Punjabi bankers, merchants, contractors, insurance-men and industrialists of Calcutta do not appear to have been seriously approached by the engineers and chemists of Jadavpur for donations and other patronage. It is time for Principal Dr. Triguna Sen, Engineers Hari Bhaumik and Sachin Banerjee, as well as engineer-businessmen like Professor-Emeritus Suren Roy,* Atul Datta, Prafulla Banerjee, Sudhir Datta, Amar Haldar, Sasanka Bagchi, Sudeb Datta, Suren Bose, Sachin Datta, and others of the Alumni Association or of the N. C. E. Committees to go about enlisting the sympathy and co-operation of these substantial components of "Big Business" and render them Jadavpur-minded. They should work also among non-Indian businessmen in order to inspire them to "adopt" Jadavpur College as one of their feeders.

Typists, printers and proof-readers have spelt out the Bengali family-names in a uniform manner, e. g., Chatterjee, Chowdhury, Ghosh, Mitra, Mukerjee, Roy, etc. I am submitting to this uniformity. In regard to the personal name there is a tendency in certain quarters to use only initials in the Western manner. This Westernization as embodied in ultra-shortening is being avoided. On the other hand, the second part of the name is being dropped, and wherever convenient, the first part

* Who, be it observed, is the first "Jadavpurian" to be appointed the Secretary, although officiating, of the N.C.E.

is being shortened in our colloquial Bengali fashion. For instance, Biren is used for Birendranath, Brajen for Brajendrakishore, Satis for Satischandra, and so forth. Greatest liberty is being taken with Rabindranath and Rabindranarayan, in which cases Rabi has been considered to be enough. Bengali readers will, it is trusted, like this intimacy and friendly atmosphere as pleasant while non-Bengali readers find the shortening convenient.

The book is dedicated to Sj. Satis Mukerjee, in whose Dawn Society (1902-06) I found the germs of the "national education" movement and in whose activities from 1905 to 1908 are to be detected the origins and first stages of what has today grown into Jadavpur College as an instrument of industrialization, *mistrification*, and economic modernization combined with culture, humanism and spirituality. Be it recalled, further, that Mukerjee was the creator of the slogan, "education through work", which became an integral part of my mental and moral outfit by the seventeenth or eighteenth year (1905). To that *mantram* as a scientific and spiritual force my debt is immense.

For the subjects-index I am indebted to my wife, Ida Sarkar *née* Stieler, author of *Edelweiss and Alprose*, and for the persons-index to my daughter, Indira Sarkar, author of *French Stories from Alphonse Daudet*.

Calcutta,
26 January 1946

BENOY SARKAR

CONTENTS

	PAGE
DEDICATION	... ... ... ... ... ... ... iii
PREFACE	... ... ... ... ... ... ... v
CORRECTIONS	... ... ... ... ... ... ... xx
INTRODUCTION: Scope and Method of the Present Study	... ... ... ... ... ... ... 1

PART I.

THE TECHNO-INDUSTRIAL COLLEGE AT JADAVPUR

CHAPTER I.	Jadavpur College as an Instrument of Industrialization, "Mistrification" and Economic Modernization	... ... ... ... ... ... ... 11
CHAPTER II.	"Mistrification" combined with Culture	... ... ... ... ... ... ... 17
CHAPTER III.	Young Jadavpur	... ... ... ... ... ... ... 19
CHAPTER IV.	The Teaching Corps	... ... ... ... ... ... ... 24
CHAPTER V.	Administration	... ... ... ... ... ... ... 27
CHAPTER VI.	Finance	... ... ... ... ... ... ... 31
CHAPTER VII.	The Jadavpur Campus	... ... ... ... ... ... ... 34*
CHAPTER VIII.	The Alumni (Old Boys) Association	... ... ... ... ... ... ... 36

PART II.

THE CALENDAR OF JADAVPUR COLLEGE IN EVOLUTION (1905-45)

CHAPTER I.	The Beginnings (1905-09)	... ... ... ... ... ... ... 43
CHAPTER II.	The Decade 1910-19	... ... ... ... ... ... ... 46
CHAPTER III.	The Decade 1920-29	... ... ... ... ... ... ... 49
CHAPTER IV.	The Decade 1930-39	... ... ... ... ... ... ... 53
CHAPTER V.	The Period 1940-45	... ... ... ... ... ... ... 57

PART III.

PIONEERING STAGES (1905-1919)

CHAPTER I.

"PIONEERS, O PIONEERS!" (1905-10)

SECTION I.	The Bengali Revolution (1905) 69
------------	-------------------------------	----------------------------

		PAGE
SECTION	2. Ashu Chowdhury's Manifesto Regarding the Boycott of Calcutta University (14 November, 1905) ...	72
SECTION	3. The National Council of Education as the Dawn Society "Writ Large" (1906-08) ...	75
SECTION	4. Technological Education at Bengal National College and School (1906-08) ...	76
SECTION	5. Pioneers of "Mistrification" and Technocracy combined with Humanism and Culture (1907) ...	81
SECTION	6. Bengal Technical Institute (1906-08) ...	86
SECTION	7. The Ideologies of Bengal Technical Institute (1906-08) ...	91
SECTION	8. The Tug of War between Bengal National College and Bengal Technical Institute (November 1905—May 1910) ...	94
SECTION	9. The Pedagogic Paraphernalia of the N.C.E. (1906-10) ...	100

CHAPTER II.

BENGAL TECHNICAL INSTITUTE AS RUN BY THE NATIONAL COUNCIL OF EDUCATION (1911-19)

SECTION	1. Teachers of Technology Old and New ...	110
SECTION	2. The Pattern of Finance and Administration ...	113
SECTION	3. Self-Sacrifice and Martyrdom ...	117

CHAPTER III.

THE JADAVPUR ENGINEERS AND TECHNOLOGISTS (1910-19)

SECTION	1. The Jadavpurians of the First Decade ...	119
SECTION	2. The Socio-Economic Significance of the N.C.E. Scholars ...	123
SECTION	3. The Progress of a Techno-Economic Primitive ...	125
SECTION	4. The First Fruits of the N.C.E. as Pioneers of Industry and Commerce ...	129

PART IV.

THE ACHIEVEMENTS AND SHORTCOMINGS OF TODAY
(1920-45)

CHAPTER I.

THE JADAVPUR ENGINEERS AND TECHNOLOGISTS
(1920-29)

		PAGE
SECTION	1. The Jadavpurians of the Second Decade (1920-29) ...	137
SECTION	2. World-Technocracy (c. 1925-29) ...	143
SECTION	3. The Extent of India's Industrialization (c. 1925-29) ...	145
SECTION	4. Jadavpur College in the Perspective of Indian Technological Education (c. 1925-29) ...	147
SECTION	5. Indian Technological Education by the "Great Power" Standard (c. 1925) ...	151
SECTION	6. Techno-Industrial Celebrities of the Classes 1920-29 ...	157
SECTION	7. Jadavpurians Looking Back ...	161

CHAPTER II.

THE JADAVPUR ENGINEERS AND TECHNOLOGISTS
(1930-39)

SECTION	1. The Jadavpurians of the Third Decade ...	162
SECTION	2. War-Preparedness in the Epoch of Economic Planning (1933-39) ...	169
SECTION	3. Techno-Economic India on the Eve of World-War II (1938-39) ...	176
SECTION	4. Jadavpur College vis-à-vis the Engineering Colleges of the U.S.A. (1939) ...	179
SECTION	5. Some Rising Engineers and Technologists ...	187
SECTION	6. Jadavpur as Seen by Jadavpurians ...	191

CHAPTER III.

THE JADAVPUR ENGINEERS AND TECHNOLOGISTS
(1940-45)

SECTION	1. The Jadavpurians of World-War II ...	192
---------	---	-----

		PAGE
SECTION	2. The British and German War-Efforts (1939-45) ... ... ...	... 194
SECTION	3. "Inflated Employment" and "Over-production" of the War-Economy in India (1939-45) ... ... ...	... 198
SECTION	4. The War-Ecology of Jadavpur College	... 204
SECTION	5. The Youngest Lions among Jadavpurians ... ... ...	... 209*
SECTION	6. The Shortcomings of Jadavpur ...	... 210

PART V.

THE ACADEMIC INTERESTS AND SOCIAL EXPERIENCES OF THE JADAVPUR TEACHING STAFF

CHAPTER	I. The Activities of the Teaching Corps	... 215
CHAPTER	II. In Mathematics ... ...	... 217
CHAPTER	III. In Mechanical & Electrical Engineering	... 220
CHAPTER	IV. In Chemical Engineering ...	... 226
CHAPTER	V. In Geology ... ...	... 232
CHAPTER	VI. In the Humanities ...	... 235
CHAPTER	VII. The Journal of the C.E.T. ...	... 242

PART VI.

GREATER JADAVPUR

CHAPTER I.

THE KEY TO PAST PROGRESS

SECTION	1. Creative Forces in the Evolution of Jadavpur College (1905-45) ...	... 245
SECTION	2. "Greater India" and Young Jadavpur	... 252
SECTION	3. Twelve Dynamic Factors in the National Education Movement (1905-45) ...	... 254

CHAPTER II.

FUTUREWARD HO!

SECTION	1. Immediate Requirements ...	... 259
	Improvements in Teaching ...	... 260
	Complaints ... ...	... 262
	Additional Establishments ...	... 263
	French and German as Subjects of Instruction ... ...	... 266

		PAGE
SECTION	College of Applied Economics and Social Work	266
2.	The Assessment of Jadavpur College and Jadavpurians by the World-Standard ...	268

CHAPTER III.

THE FOUNDATIONS OF GREATER JADAVPUR

SECTION	1. The Techno-Scientific Educational Background for a Greater Jadavpur	... 271
SECTION	2. Technical Education for Fifty Percent of the Student Population	... 274
SECTION	3. Wanted Fifty Lakhs in Five Years for Jadavpur	... 276
SECTION	4. Initiations and Expansions <i>vs.</i> Abolitions and Retrenchments	... 279

CHAPTER IV.

THE STUDENTS OF GREATER JADAVPUR

SECTION	1. Fifty-day "Factorification" Per Year A Pedagogic Necessity	... 283
SECTION	2. "Big Business" and Young Jadavpur	... 285

CHAPTER V.

THE TEACHING STAFF OF GREATER JADAVPUR

SECTION	1. Two-thirds of the Teaching Personnel to Possess Foreign Training	... 288
SECTION	2. Research in Engineering & Technology	... 291
SECTION	3. Jadavpur College and the Indian Science Congress	... 292

CHAPTER VI.

NEW VISTAS AND "ANOTHER LIFE BEYOND"

SECTION	1. Jadavpur <i>vis-à-vis</i> the Proposed Central Institute of Technology	... 294
SECTION	2. The Glib Talk of an "Indian M.I.T."	... 297
SECTION	3. Development Department of the N.C.E. a Desideratum	... 300
SECTION	4. Degrees <i>Honoris Causa</i>	... 302

		PAGE
SECTION	5. Sturdy Jadavpurians During Demobilization and Depression (1946-50)	304

CHAPTER VII.

EPILOGUE

Total "Alumnification" of the N.C.E.	310
---	-----

POST-SCRIPT TO PART II.

The Calendar of Jadavpur College in Evolution December 1945—January 1946	317
---	-----

APPENDIX A

STUDENTS OF THE NATIONAL COUNCIL OF EDUCATION, BENGAL

I. The Number of Students and the Number of Passes 1913-45	327
II. New Admissions 1935-1944	328
III. The Total Number of Higher Engineering Students 1939-46	328

APPENDIX B

OFFICE-BEARERS OF THE NATIONAL COUNCIL OF EDUCATION BENGAL

I. Presidents of the N.C.E. 1906-45	329
II. Secretaries of the N.C.E. 1906-45	329
III. Trustees of the N.C.E. 1906-45	329
IV. Treasurers of the N.C.E. 1906-45	330
V. Rectors of the N.C.E. 1906-45	330
VI. Auditors of the N.C.E. 1906-45	330
VII. Hem Basu-Mallik Professors of the N.C.E. 1906-42	330
VIII. Probodh Basu-Mallik Fellows of the N.C.E. 1913-42	331

APPENDIX C

THE COMMITTEES OF THE N.C.E. 1945

I. "General Department"	331
II. Jadavpur College (See pp. 27-28)	332
III. National Council of Education (See p. 29)	332

APPENDIX D

PRINCIPALS AND SUPERINTENDENTS OF BENGAL NATIONAL COLLEGE,
BENGAL TECHNICAL INSTITUTE, AND JADAVPUR COLLEGE OF
ENGINEERING AND TECHNOLOGY 1906-45

	PAGE
I. Principals (1906-45)	332
II. Superintendents (1906-41)	333

APPENDIX E

The Teaching Staff 1945 333

APPENDIX F

FINANCES

I. Receipts and Expenditures of the N.C.E. 1925-44 ...	338
II. Donors and Donations 1906-46 ...	339

APPENDIX G

Foreign-Schooled and/or Foreign-Factoried
Jadavpurians 1910-45 345

APPENDIX H

"Big Business" in Co-operation with Jadavpur
College 349

APPENDIX I

THE ALUMNI ASSOCIATION OF THE NATIONAL COUNCIL OF
EDUCATION, BENGAL

I. Presidents, Treasurers and Secretaries 1921-45 ...	351
II. Executive Committee of the Alumni Association ...	355
III. Consulting Educationists (Hony.) ...	356
IV. Finance Committee 1945 ...	356
V. Silver Jubilee Fund Committee 1945 ...	357
VI. Publicity Bureau 1945 ...	357
VII. Foreign Education Committee 1945 ...	358

APPENDIX J

KIRON ROY MEMORIAL COMMITTEE

Patrons, President, Secretary, Members ...	359
Donations Promised at the Memorial Meeting ...	361

INDEX

I. Subjects	362
II. Persons	369

CORRECTIONS, PLEASE !

His Lordship the Printer's Devil has once in a while taken the liberty to use wrong words, spellings and punctuations at his own sweet will. Two of his unpardonable mistakes are being pointed out here.

Before proceeding further every reader is requested to kindly make the following corrections in his copy:

On p. 203 line 31 please write 1945 for 1943,

" " 312 " 14 " " "pioneers" for "prisoners."

On p. vii of Preface kindly note that the Government of India finances the All-India Board of Engineering Studies which has been sponsored by the Association of Principals of Technical Institutions. (See p. 63).

Thanks.

INTRODUCTION

Scope and Method of the Present Study

The spiritual import of a school or college is the ideological complex of teachers and students. But objectively or rather materialistically considered, an educational institution is an organism of six limbs. It means (1) the buildings, grounds, laboratories, workshops, libraries, gymnasia, pavilions, stadia, etc., (2) the administration, the Principal, the Superintendent, the Council, the Committees, and so forth, (3) the finances, funds, endowments, subscriptions, donors, and benefactors, (4) the teaching *corps*, (5) the courses of study and subjects of instruction, and last but not least, (6) the students. Each one of these limbs has a growth and development, i.e., an evolution of its own. All these evolutions put together constitute the history of the school or college as a six-limbed configuration.

In the present study an attempt is being made to do justice to each one of these limbs. No monistic obsession is being indulged in with regard to any item, however important it be. There is no doubt, however, that certain aspects are being stressed and special light thrown on them.

Surveyors of educational institutions are likely to dwell at length on administrators and donors, founders and benefactors. The changes in the system of administration, the activities of the governing body, the financial conditions of the school and college as well as the charities and endowments made by philanthropists command, as a rule, the attention of writers of historical reports about such establishments. These items are certainly very worthwhile. But in the present survey attention is being focussed—although not exclusively—on the students, their activities, their careers and their prospects.

The qualifications, interests and creativities of the teaching *personnel* are also being thrown into relief. This is an item generally somewhat overlooked in the surveys of educational institutions. As a school-master it is impossible for me to ignore or belittle the great reality that the fundamental fact of the school-*Gestalt* is to be found in the interhuman *liaisons* between the teacher and the pupil. The dominant rôle in this social pattern-complex is that of the teacher. Everything else,—even finance,—may be taken to be subordinate and auxiliary. My pedagogic theory is pluralistic enough to take cognizance of the most diverse factors in an educational institution. But my factual bias is quite obvious. I am more interested in teachers than in administrators and donors, and more in students than in any body ese.

The history of a college can indeed be often taken to be in the main but a biographical album of its collegians. The study of Jadavpur College will, therefore, look, in the first place, like an account of Young Jadavpur at work on the Jadavpur Campus. In the second place, this study is essentially an analysis and an examination of the post-academic professional activities of Jadavpurians, the engineers and technologists who possess the hall-mark of Jadavpur College.

In connection with the present survey history has not been allowed to become identical with an antiquarian research into the past. Nor has it grown into something like a romantic revelling into the glory that was the *swadeshi*-boycott-*swaraj*-national education movement of the Lal-Bal-Pal triumvirate. This is by all means a great theme. But a larger volume would have been required to do justice to the demands of the Bengali revolution (1905-10). I have not ignored the past. But on account of the limitations of space and also of time I have concentrated my attention on the present. And I am defining history as but a tool for the transformation of the present and for the conquest of the future.

The orientations of this historical study about the National Council of Education are therefore directed to the factories, workshops, mills, mines and allied industrial establishments of today and tomorrow. The present investigation is frankly and purposively futuristic. And although objective from top to bottom, it is, besides, thoroughly utilitarian and pragmatic. The study is, indeed, more analytical than historical. And it is more techno-economic than pedagogic.

It deals with the *vishva-shakti* (world-forces) in the engineering and technological education of diverse countries, and exhibits Jadavpur in the perspective of international pedagogics. It seeks, further, to invite attention to the world's progress in industrialism, technocracy, industrial research, scientific discoveries, etc. Nationalist India is thereby being compelled to ponder over the tremendous lags and backwardnesses of the Indian economy *vis-à-vis* the economic developments of go-ahead peoples.

The past is being exhibited in snapshots. No vagueness is being left about the evolutionary stages. But my chief concern is with Jadavpur College as it is today. The contributions of this College to the industries of the country are my fundamental data,—and simultaneously or rather automatically, therefore, also its limitations, shortcomings and defects. At every step, again and again, my interest lies in exploring the possibilities of Jadavpur College as an instrument for the further “*mistrification*”, industrialization, “*factorification*”, and economic modernization of the country in the near future. The survey is meant to be a help to professional engineers, technologists, business managers, and industrial researchers both as individuals as well as organizers, directors or promoters of factories, workshops and research institutes.

And it is not to Indians alone that the book is calculated to have an appeal. The study should prove to be of interest to Eur-American and other non-Indian businessmen as well as

educators. All foreigners who wish to see a speedy industrialization and technocratization of the Indian people in the interest of their own and world progress are likely to find this survey useful.

The *Annual Reports* of the N. C. E. are often defective in dates and sometimes poor in details. Besides, for two years during World-war I (1914-18) there were no Reports published. All the same, the information available is, department by department and item by item, copious enough to enable an author to produce a substantial historical work four times the size of the present publication. And such a large volume should not fail to be exceedingly interesting. For, the history of the National Council of Education is in many essential respects the history of the Bengali people and culture,—of Bengal rural as well as urban, in the twentieth century. It is bound of course to throw light on education in general and education in engineering and technology, *mistrification* and factorification in particular. But it cannot end there. It can at the same time exhibit the manifold activities of the Bengali masses and classes in industry, science, agriculture, commerce and research. Numerous creative Bengalis of light and leading, both in *Mofussil* and Calcutta, that have succeeded in placing Bengal and India in the midst of *vishva-shakti* (world-forces) during the last fifty years are sure likewise to hold forth in a large-sized historical study about the N.C.E.

My *dal-bhat*, modest and poor as it is, has been coming for seventeen or eighteen years as a full-time employee of Calcutta University. But my honorary contacts with the National Council of Education are as old as its beginnings in 1905. It has, therefore, been possible for me to watch and humbly participate in its developments in diverse capacities both at home and abroad for the entire priod of its existence. The fathers and grandfathers of Jadavpur College have been as intimately known to me as are the robust red-blooded sons and grandsons.

We are living today for tomorrow and day after tomorrow. The ambitions, adventures, capabilities, energies, exploits and creativities of the sons and the grandsons are therefore perhaps somewhat overshadowing—in this picture—the pioneering explorations and achievements of the fathers and the grandfathers. This homage to youth, to the youngsters, the juniors and the juniormost,—will, it is trusted, be appreciated by the elders of the National Council of Education as well as by the seniors of the Alumni Association.

Some of the publicists, educators and donors of the period 1905-10 are living still. Their reminiscences might be brought together and relevantly exhibited in a large-sized book about Jadavpur College, especially such as might deal with antiquities. But the present work has not been so elaborately planned and antiquarian-minded. It is regrettable that on account of space considerations it is not possible to dwell at length on the souvenirs of persons who took active part in the N. C. E. and the Society for the Promotion of Technical Education in the pioneering stages.

It is perhaps not irrelevant to say at the outset that a simple pedagogic idea runs through this study. My *sutra* (formula) in the pedagogics of technocracy and machinism runs to the effect that not every *mistri* or technician can or will become an engineer. But, on the other hand, nobody can become an engineer who has not been a *mistri*. The daily handling of tools, implements and machineries belongs to the *mistri*'s routine of work. This routine of daily tool-handling is the fundamental schooling for the engineer. The *mistrification*, as thus understood, of the educational system has been a life-bood to the present author since his Malda District Council of National Education and *Shiksha-Vijnan* (Science of Education) days (1906-14).

Further, the real or substantial training-ground for the engineer is the manufacturing establishment of the market

rather than the Laboratory, Workshop or Class-room of the College. This ideology about the rôle of the *mistri* and the factory in engineering and technology, the factorification of the students of engineering and technology, and the *mistrification* of general culture has but been intensified by extensive travels and investigations in foreign countries as well as contacts with engineers, chemists, businessmen, industrialists and promoters of research in science and industry, both at home and abroad. In the present survey about Jadavpur College of Engineering and Technology and the National Council of Education's forty-year activities the *mistrification-cum-factorification* ideology has therefore been the dominant *idée-force* or *Leitmotif*, nay, frankly, an obsession.

The N. C. E. continues indeed to function as a University for the promotion of arts and sciences as well as general culture, although Bengal National College has ceased to exist. For all practical purposes, however, it is to be treated in the main as a Technological and Engineering University corresponding to the *Technische Hochschule* of Berlin, *Conservatoire des Arts et Métiers* of Paris, and the California or Carnegie or Massachusetts Institute of Technology in the U.S.A. It is only by an engineer or a technologist that a book about such an institution can be properly written. The present author's incompetency in this regard is being perpetually felt by himself.. The work, as it has turned out to be, is nothing but a layman's survey.

A book about a College of Engineering and Technology cannot be adequately compiled on the strength of reports and documents available in a library or an office-room. The author must be in a position to pay visits to mines, factories, workshops, laboratories, research institutes, etc. as well as have interviews with engineers, metallurgists, chemists, industrial managers, and so forth. "*Mistrification*" as well as "*factorification*" are the minimum qualifications required of a person

who can think of doing justice to the subject matter of a book like this.

The backbone of the present study has been furnished by the list of addresses of 674 Jadavpurians published in the *Report of the N. C. E.* for 1943. I wish it were possible to visit the firms with whom these engineers and technologists of Jadavpur are employed and get the reactions of the industrial establishments about the merits and demerits of the College teaching. The attempt would have cost more time and money than I could command. But that is a valuable method of investigation and should be adopted in the next venture in publication about this College.

In the annual *Reports* since 1925 my name appears on more than one Committee of the N. C. E. for many years. But as it is not agreeable for me to be a Committeewallah, the number of meetings attended by me during twenty years can be counted at fingers' ends. This conspicuousness by absence has enabled me to avoid the unpleasantnesses of partisanship such as are inevitable in interhuman relations of public institutions. Perhaps, this absenteeism is a defect. But, on the other hand, it has been possible for me to look at the development of the College and its affairs in a detached and thoroughly neutral manner. As in many other instances, in regard to the interpretations and viewpoints presented in this publication also I should not be surprised, therefore, if my dispassionateness and neutrality land me up in the position of the minority of one.

Be it observed, further, that the views and interpretations given out in this book about industry, technocracy, world-economy, comparative pedagogics, general education and culture or about the developments of the N. C. E. and Jadavpur College are not those of the authorities of the N. C. E., the College or the Alumni Association. They are the author's own,—except when opinions of others are quoted. The

author's views, again, are in keeping with those in his previous works like *Shiksha-Vijnan* (Science of Education) series (1910-14), *The Futurism of Young Asia: Sociology of Races, Cultures and Human Progress* (1922), and *The Equations of World-Economy* (1943).

Many families in Calcutta and the *Mofussil* are intimately interested in Jadavpur College in more than one capacity. Evidently it should be possible for them to see shortcomings in the present publication. Nobody would be more happy than myself if some of these shortcomings could be removed as a result of friendly criticism and constructive suggestions for a subsequent edition. I trust such creative co-operation will be available.

PART I

The Techno-Industrial College at Jadavpur

CHAPTER I

Jadavpur College as an Instrument of Industrialization, "Mistrification" and Economic Modernization

- The education for industrialization and economic modernization offered by the National Council of Education at Jadavpur College comprises the following items:

- I. Engineering Courses : (1) Mechanical Engineering, (2) Electrical Engineering and (3) Chemical Engineering. Admission requirements : I.Sc. of the Indian Universities or any equivalent standard. Period of tuition : 4 years. Degrees : B.M.E., B.E.E., B.Ch.E.
- II. Junior Technical Course. Admission requirements : Matric of the Indian Universities or any equivalent standard. Period of tuition : 3 years.
- III. Survey and Draftsmanship Course. Admission requirement : Matric or any equivalent standard. Period of tuition : 2 years.
- IV. Agriculture Course. Admission requirements : Matric or any equivalent standard. Period of tuition : 2 years.

In regard to teaching in the Engineering Courses it is to be observed that in each year at least half the time is devoted to practical work. The time-table for the different classes is exhibited below in hours (or periods) per week :

	M.E.		E.E.		Ch.E.	
	Theoretical	Practical	Theoretical	Practical	Theoretical	Practical
First Year	...	18	19	18	19	19
Second Year	...	19	20	19	20	17
Third Year	...	18	20	20	19	17
Fourth Year	...	18	21	17	20	14
						23

In the Mechanical Engineering course the student is taught the use of modern machine tools, foundry practice, as well as forging and welding. The study and design of power plants, turbines, steam engines, internal combustion engines, pumps, boilers, compressors, etc. belongs to this course. Refrigeration and air-condition system are also taught. Business organization and factory management (comprising labour problem, wage systems, welfare methods) are likewise among the subjects of instruction. The B.M.E. is therefore competent enough to take charge of design, operation, maintenance, and management of industrial concerns, workshops, power houses, and waterworks.

It may be observed in this connection that while studying machine-design the student is given option to select any two from the following, of which at least one must be prime mover : (1) reciprocating steam engine, (2) internal combustion engine, (3) steam turbine, (4) water turbine, (5) steam boiler, (6) pumps or compressors, (7) machine tools. The course on machine tools comprises principles and design of rotary machine-tools, e.g., simple and screw-cutting lathes, turret lathes, automatic lathes, boring mills, etc., reciprocating machine tools (shaping machines, slotting machines, key-setting machines, etc.) and machine-saws (circular saws, band saws, etc.).

The graduate in Electrical Engineering knows the design, construction, operation and maintenance of electrical machinery. He can take charge of electric supply schemes, illumination, electric railways, communication, etc. The Electrical Engineering course is comprehensive enough to comprise steam engine, boiler, turbine, strength of materials, hydraulics, thermodynamics, etc, as well as electrical measuring instruments, a.c. and d.c. machines, power plant engineering, telegraphy and telephony.

About the items taught it may be pointed out that the

subject of electric power transmission is studied with reference to hyperbolic functions, high voltage line insulators, corona effect, load curve and load duration curve, costs and charges, and so forth. In electric traction are studied speed time curves, energy consumption, train resistance, traction motors, braking, etc.

In workshop practice the student is required to overhaul electric machines, locate faults in electric mains, measure the resistance of the earth plate, and so forth.

In the laboratory for communication engineering experiments on radio, telegraphy and telephony are carried out. Students are taught to repair, design and build up electrical generators and motors in the Electrical Engineering Workshop.

Both for M.E. and E.E. students are required to write a paper of about 2,000 words on a current engineering topic and give a talk on its contents before the whole class. This is taken as part of practical work.

In the course of two visits to Eur-America covering as they did some fourteen years (1914-25 and 1929-31) my attention has been drawn to the fact that it is only during the present century that Chemical Engineering as a science has made an independent place for itself in the Universities of Germany and the U.S.A. The subject was hardly known in other Eur-American countries until the end of World-War I (1914-18). In India, naturally, the category remains yet a new-fangled one. But it has been getting interesting to "Big Business," and Jadavpur College as well as Jadavpurians of the last two decades have served to render it somewhat familiar to industrialists and businessmen.

Chemical Engineering is not identical with applied or industrial chemistry with which it is generally confounded. Nor can a club of chemists and engineers by itself produce what a chemical engineer, strictly so called, can produce. Applied Chemistry deals primarily with *general* processes

and products, as says the prospectus of Jadavpur College for 1945-46. Chemical Engineering, on the other hand, is chiefly concerned with the quantitative study of the various unit operations, such as grinding, roasting, dissolving, filtering, evaporating, distilling, crystallizing and drying, which in their sequence make up a chemical process on an industrial scale. The chemical engineer has to do much more than and something different from the mechanical and electrical engineer who are concerned with the construction and operation of mechanical devices for the generation and utilization of power. The student of Chemical Engineering has to study the flow at different temperatures and pressures of fluids and semi-fluids differing widely in viscosity and density and in chemical and physical stability, the design and operation of unit types of chemical plant, the chemical and physical testing of special materials that are used in the construction of chemical plants.

The course in Chemical Engineering at Jadavpur comprises (1) chemical industries, such as coal tar and its distillation of products, nitric acid, bleaching powder, liquid chlorine, and sodium carbonate, and (2) technological industries (like pulp, paper, artificial silk, starch, glucose, dextrin, cane sugar, *gurh*, molasses, alcohol, tanning, glue, plastics, matches, fertilizers, glass, enamel, pottery, lime, cement, etc.). Metallurgy is studied with reference to fuels, furnaces, iron, steel, as well as copper, lead, zinc, aluminium, tin and gold. Then there are the technology of oils and fats, as well as soap technology. Students are required to make the design and lay-out of a complete chemical plant with exact specification of the machinery to be employed and interconnections of different parts. There is a special course in electrical engineering, both theoretical and practical, which every student of Chemical Engineering has to take in the second year class.

The Chemical Engineering Laboratory is equipped naturally with the instruments, machines, tools and imple-

ments for technical analysis, electro-chemistry, physico-chemical measurements, etc. Some special features are (1) a soap plant, (2) an oil extraction plant (solvent method), (3) equipment for the refining of vegetable oils, (4) electro-plating plant, and (5) water distillation plant.

Be it noted that in the final (fourth year) class every student of Mechanical, Electrical and Chemical Engineering has to take Engineering Economics. It has to be studied for two hours a week during the year. Not less than fifty lectures are delivered on this subject. Among other things this course deals with book-keeping, accounting, sales day-book, ledgers, trial balance, profit and loss account, cost-accounting, costing, premium bonus, departmental overhead allocation to product, fatigue, movements, work and rest periods.

Engineering Economics is a title hardly yet familiar in the Indian academic and scientific world. But the business side of engineering has been demanding increasing attention in the U.S.A. It is being emphasized that engineering can be converted into community service only through the medium of business. Works like *Engineering Economics* by Professor John Fish of Stanford University, or *Economics for Engineers* by Professors Edison Bowers and Henry Rowntree of Ohio State University are planned on the basic idea that the engineer's professional success and contribution to public welfare depend in a great measure on his understanding of engineering economics.

In connection with the Economics as taught at Jadavpur may be mentioned the annual programme of six lectures on Banking for which the present author is responsible as honorary professor. The lectures deal with such topics as the "Cottage Banks" of Bengal and large *Swadeshi* Banks of India in the perspective of big Eur-American banking institutions, the balance-sheet categories of British, German and French banks, deposits and loans of American banks, "active" and "passive"

banking, Japanese banks, banking business as regards functions and risks in agriculture, industry and commerce, and active banking of the Central Bank of India.

The Junior Technical Course covers three years and comprises, among other subjects, (1) practical mathematics, (2) physics, (3) chemistry, (4) electrical engineering, (5) mechanical engineering (mechanics, heat engines, boilers, pumps, applied mechanics), (6) drawing, (7) workshop practice, and (8) powerhouse practice. In the first year the students have to do every week 11 hours of theoretical and 26 hours of practical work. In the second year the proportion is 17 to 20 and in the third 11 to 27.

The two-year course for Survey and Draftsmanship offers the following subjects: mensuration, trigonometry, building construction, survey, drawing, office work, applied mechanics, and estimating. The students have to do chain surveying, compass survey, plane table survey, cadastral survey, cross-section levelling, contouring as well as theodolite surveys.

In the two-year Agriculture Course the first year has 10 hours of theoretical as against 30 hours of practical work. In the second year the students have to devote 24 hours to practical as against 14 hours in theoretical work. The subjects taught are (1) chemistry, (2) agricultural botany, (3) farm crops (vegetable gardening), (4) soils and fertilizers, (5) shop-work (carpentry, smithy), (6) agricultural zoology, (7) animal husbandry, (8) horticulture and floriculture, (9) irrigation and drainage, (10) agricultural economics, and (11) farm machinery.

Altogether, Jadavpur offers an atmosphere of *mistrification*, so to say, the training of intellectuals as *mistris* in tools, implements, machines, and factory work. Be it agriculture, draftsmanship, junior technical course, or higher engineering the ecology of Jadavpur College is that of manual labour, technique, instrumental work, machinism, exactness, and

precision in thought. The methods of new industrial process are propagated here. Economic creativities are being placed on modern foundations on the Jadavpur Campus.

The Library contains some 13,000 volumes. There is a Reading Room attached.

CHAPTER II

“Mistrification” Combined with Culture

It is worth while to add that Jadavpur College, while functioning as an instrument of industrialization, *mistrification*, technocratization, and economic modernization, seeks at the same time to provide the “humanities” also as an integral part of engineering and technological education. World-history is a compulsory subject for every student of mechanical, electrical and chemical engineering. It is taught in the second year class as a weekly two-hour course. Not less than fifty lectures are delivered on this subject. In the group of humanities may be listed also topics such as engineering economics (already referred to), industrial psychology, labour economics and social work, “man the known, and man the unknown,” English Language and Literature, geology, and last but not least, religion. The Jadavpurians,—engineers and technologists,—*mistrified* and factorified as they have to be,—grow up as men of culture.

The cultural programme of Jadavpur College is comprehensive. One can hardly overestimate the value of the Extension Lectures organized by the N.C.E. under the direction of Professor Kali Prasanna Das-Gupta from 1921 to 1942. These lectures dealt with diverse topics of arts and sciences and constituted some of the most stimulating intellectual

and moral forces in the socio-academic life of Bengalis at Calcutta. Virtually everybody who is anybody in the Bengali sphere of literature, science, history, philosophy, economics and social service has been inducted in and through this programme. Be it noted that Professor Das-Gupta's public lectures in connection with the Hem Basu-Mallik Chair and Dr. Bata Ghosh's lectures as Probodh Basu-Mallik Fellow have likewise been marked by humanizing values.

Finally, it is not possible to minimize the importance of the religious instruction imparted on the Jadavpur Campus. For over a generation down to 1942 Professor Satis Chatterjee's lectures on the *Gita* and the lives of eminent religious reformers were a regular feature of the N.C.E.'s work. Since then the Department has been in charge of Professor Heramba Bhattacharyya Nyayaratna. His public lectures on "The Modern Age and Religion" have aroused keen interest. The regular classes on the *Gita*, *Manu Saṁhita*, *Bhaktiyoga*, *Nityachara* and the *Upanishads* have likewise been supplying a real need. In this connection may be suggested the establishment of a *liaison* between the N.C.E. and the Ramakrishna Mission for lecture programmes by the Swamis. It was profound statesmanship on the part of Sj. Brajen Roy-Chowdhury in discussions with Satis Mukerjee, already in 1905-07, to insist on religious education as an essential limb in the policy of the National Council and to earmark a substantial fund for this purpose. Not many students perhaps attend these classes or lectures systematically. But many of those who occasionally attend them come away often with permanent lessons for the development of *morale* and personality.

CHAPTER III

Young Jadavpur

The Jadavpur Campus is the theatre of activities of some 1,200 young men, Bengali and non-Bengali. Seventy per cent of this student population is post-I.Sc. and post-B.Sc. Engineering is certainly the science of their choice. But non-engineering topics command their attention too.

On the Jadavpur Campus the budding engineers and technologists exhibit their cultural creativities by staging such Bengali plays as *Mishar-Kumari* (The Lady of Egypt), *Birinchi Baba* (Father Birinchi), *Matir Ghar* (The House of Mud), *Dui Purush* (Two Generations), and *Chakmaki* (The Flint). They have their orchestra too. The experts among them try their skill and develop it on the violin, the *sitar* (stringed instrument), the flute, the *tabla* (petty floor-drums), and the harmonium. In elocution and essay writing they have to take part as a matter of course. According to the College regulations they have to pass a test in the preparation of an "abstract" on engineering problems as well as make short speeches (10-minute talks) in order to "soutenir la th  se" (maintain or uphold the thesis), as the French and Swiss Universities compel the candidates for doctorate to do.

They compile and publish also the *Tech* (1943, 1944), an illustrated annual of some 150 pages describing the career of everybody who is in the final year. A bit of their literary workmanship can be tasted in the following para about Amulya Bose, E.E., in the volume (p. 109) edited by the class of '43. ' "It was really a treat to hear Amulya play the *tabla* on the class-room desks, whenever anybody sang a song. That anybody was, however, ninety-nine cases out of a hundred, Sudhis Sarvadhikari. A *Kheyal* (melody) in *Jay-jayanti* (mode) was really a great treat after the "transmission" class, as is a hearty meal after a tiresome eight-

hour factory shift. Amulya's other qualifications are his aptitude for games, especially cricket. (N.B. Amulya is not very friendly with books)."

Another '43 chum,—a Chemico,—is described as follows (p. 145) : "You may manage to forget your formula but not your Shortie (Sudhir Mukerjee) and his antics. How can you forget the calm nonchalant way in which he plays practical jokes on you, often with disastrous results to your experiments and to your person even? And how can you fall foul of him when he greets your anger with a beaming smile and an all-too innocent gleam in his eyes? Shortie is the type necessary to enliven things when everything becomes desperately boring. Go ahead, Shortie ! the world needs more men like you."

In the matter of humanistic relations with professors these students of engineering and technology exhibit as much gusto as the most literary-minded and culturally-endowed students of fine arts, philosophies, and social sciences. About one teacher the *Tech 1944* observes as follows : "Though somewhat rude to students sometimes, he never lets a fellow down at the end of the year" (p. 52). The statement about another teacher runs thus : "Considering the pains he took to give us a bit of his learning we will be doing great injustice to him if we start forgetting Differential already" (p. 44). An Assistant Professor of Physics is described as "an unimpressive teacher but a very impressive personality" (p. 49). For an Instructor in Mechanical Engineering we have the following remark : "One would take him to be slightly unbalanced until one sees him figure a jig for the universal mill" (p. 51). A Lecturer in Chemistry has got the following encomium : "We bend low to this majestic personality about whom we dare not comment" (p. 55). The observations about an Assistant Professor of Mathematics are worded as follows : "The thrilling cry and the reflecting head was a terror to our

old mates. But the mild habit and the active spirit dashed all these things to the past and past only" (p. 54).

Nitric acid, transformers and lathes have evidently failed to crush humour and humanism out of existence in this *milieu* of *mistrification*, technocracy, factorification, and economic modernism.

- Young Jadavpur is, further, well-known in Calcutta and beyond as strong in football, hockey, cricket and tennis, as well as long-distance walks. The Jadavpur grounds, Gymnasium and Pavilion have a name in the sporting world. Physical culture, boxing and *lathi* (rod) play are indeed officially attended to by the College authorities. The Students' Union functions in many lines, not the least substantial of which is the provision of stipends and other aids for needy comrades. Professorial co-operation is extended to the students in all their activities not only by Sj. Baneswar Sarkar, Instructor of Physical Culture, and Sj. Jahar Paul, Instructor of Boxing and *Lathi*, but by grave and machine-minded engineers as well. The American-armoured Professor Sudhir Chakravarti, B.S. (Worcester), M.S. (Michigan), Mechanical Engineer, and the Scottish-screwed Professor Hem Guha, B.Sc. (Edin.), Electrical Engineer, are humanists of fine flavour on the Jadavpur Campus.

Educational and pleasure tours are undertaken. Visits to industrial concerns like the Basanti Cotton Mills, Calcutta Tramways Works, Bengal Belting Works, National Iron Works, and Bengal Electric Lamp Works,—all in and around Calcutta,—are mentioned for 1943. The Lac Research Institute at Ranchi, the Mica Mines at Kodarma, and the Cotton Mills at Gaya as well as the Hudru Falls at Hazaribagh have commanded the attention of some of these excursionists. The *Tech 1944* makes it a point to observe: "The larger industries of course refused us admission rightaway." That is an item that remains to be straightened out

between the Jadavpur College authorities and 'Big Business.'

The larger industrial establishments have need to "adopt" Jadavpur College as one of their feeders and help up its efficiency by co-operation of every sort. This co-operation would comprise yearly financial support, in the first instance. In the second place, Big Business will have to admit Jadavpur students as technicians in systematic training for, say, two months every year during the period of their academic life. Finally, the permission to occasionally visit the works, mines, and factories should be accorded to these boys as a matter of course.

Another specimen of the cultural creativity of the Jadavpur Campus is the *Journal of the College of Engineering and Technology*. It is, besides, a result of co-operative endeavour between the teaching staff and the student corps. The *Journal* is not a mere students' magazine or an organ of the College for news and views. It caters to some of the techno-scientific, industrial and engineering demands of the Indian world of culture in a substantial manner.

In the March 1945 number appear articles like "The Energy Index of India," "Hydroelectricity in India," "Use of Synthetic Materials as Bearings for Mills and Other Purposes," "Vehicles Driven by Producer Gas," "Beware of the Static," "Social Aspects of Engineering," "Outline of Broadcasting Systems," "High Pressure Technique," and "Water-cooling System of a Motor Car Engine" by students. Then there are sectional notes devoted to Electrical, Chemical and Mechanical Engineering based on current techno-industrial topics. Professor Hiralal Roy discusses the obstacles to industrial development. The Editorial commences with the Indian Science Congress, drawing attention to Sir Shanti Bhatnagar's presidential address, discusses the problem of technical education in post-war India in which Engineer Hari

Bhaumik's criticisms on Sargent's *Report on Post-war Educational Development in India* are brought into relief, as well as throws light on the *Bombay Plan Part II*. The Founders' Day Address (7 January, 1945) by Mme Sarojini Naidu and the Convocation Address (25 February, 1945) by Dr. John Matthai are also given in outline. The number contains, finally, reports about the Alumni Association, the College A.R.P. and the Sporting Club.

It remains to be noted that *vis-à-vis* the country-wide movements Young Jadavpur does not function in splendid isolation. Its relations with the rest of Young Bengal, nay, of Young India are intimate and steady. The Jadavpur Campus is not interested exclusively in the questions raised on the platform of the Indian National Congress. Labour movement, socialistic programmes, and communism, both national and international, command likewise the interest of Jadavpur students. In this respect Young Jadavpur is an integral part of the entire Indian student population. The ideologies of Subhas Bose and Jawaharlal Nehru (1937-40), slogans like "Quit India" and "People's War" (1942-45) and so forth have as much meaning to these budding engineers and technologists as to the students of arts and sciences at Calcutta and elsewhere. During the cataclysmal Bengal famine of 1943 Young Jadavpur rose to the call of social service among destitutes, in which the lead was taken by Professor Gopal Banerjee (chemist) and other members of the teaching staff.

On close inspection it appears that Young Jadavpur has failed up till now to organize an Exhibition of paintings, drawings, etchings, and sculptures by Bengali and non-Bengali artists. Musical *soirées* under the command of distinguished *ostads* (music masters) do not seem to have been arranged on the Campus as yet. Besides, they have perhaps overlooked inviting literary men and women to hold confer-

ences on poetry, drama, fiction, literary criticism, aesthetics, philosophy, etc. Symposia of scientists, engineers, business-men, economists and social workers appear likewise to have been off their list. It may not be difficult for Young Jadavpur to get acculturated to these as yet neglected cultural and man-making functions in the near future.

One must not ignore the fact that some of the distinguished painters, actors and writers of Bengal are Jadavpurians (alumni of the N.C.E. at Calcutta or in *Mofussil*).

CHAPTER IV

The Teaching Corps

The members of the teaching staff can be grouped in the following manner :

- I. Principal : 1.
- II. Mechanical Engineering (Professors : 5, Asst. Professor : 1, Lecturers : 7, Foreman Instructor : 1, Instructors : 9) : 23.
- III. Electrical Engineering (Professors : 4, Lecturers : 4, Instructors : 6) : 14.
- IV. Chemical Engineering (Professors : 3, Asst. Professor : 1, Lecturers : 3, Demonstrator : 1, Instructors : 4) : 12.
- V. Physics (Professor : 1, Asst. Professor : 1, Lecturers : 3, Demonstrators : 2, Instructor : 1) : 8.
- VI. Mathematics (Professor : 1, Asst. Professors : 2, Instructors : 2) : 5.
- VII. Humanities (Modern and Contemporary History : 1, Engineering Economics : 1, Labour Economics, Industrial Psychology and Social Work : 1, Man the known, and man the unknown : 1, English Language and Literature : 2, Geology : 1, Religion : 1) : 8.

VIII. Survey and Draftsmanship : 2.
 IX. Agriculture (Lecturer : 1, Instructor : 1) : 2.
 X. Physical Culture (Instructors : 2) : 2.

The teaching staff consists of 77 persons in ten different groups or departments. One name appears twice. The total number is therefore 76. Only one is a non-Bengali (Gujarati). This is a recent acquisition in the person of Professor Nandlal M. Shah, B.A. (Bombay), M.S. (Massachusetts Institute of Technology, Boston). The appointment has led to the strengthening of the Electrical Engineering Department.

Forty-five of these teachers are alumni of the N.C.E. Nine among them have had subsequent tuition in American, German or British Universities and factories. Twentynine out of the 76 possess Calcutta University degrees or diplomas. On the teaching staff France is represented by 1, Germany by 4, the U.S.A. by 6 and England by 7. Altogether 18 out of 76 were foreign-schooled and foreign-factoried.

The possessors of degrees or diplomas may be scheduled as follows according to the source of their qualifications :

Source of Degrees	Mech.	Elec.	Chem.	Phys.	Math.	Human	Agri.	Survey	Physic.	Total
Jadavpur	...	22	13	8	1	1	—	1	—	46
Calcutta	...	2	4	5	7	4	3	—	2	29
England	...	2	1	—	—	—	3	1	—	7
France	...	—	—	—	—	—	1	—	—	1
Germany	...	3	—	1	—	—	—	—	—	4
U. S. A.	...	1	3	2	—	1	—	—	—	6
Bombay	—	—	1	—	—	—	—	—	—	1
	30	22	16	8	5	7	2	2	2	94

In the above table the Principal has been taken as a part of the Mechanical Engineering Department to which he academically belongs. Jadavpur College furnished the basic education of many. A certain number has both Calcutta and Jadavpur degrees or diplomas. Persons with Calcutta and/or

Jadavpur as well as foreign degrees are also to be found. Hence the total number in the table is larger than the total number on the staff. Four are doctors of engineering.

The teaching *personnel* of Engineering Colleges and Technological Institutes or Universities of Eur-America is invariably less known and spoken of in "society" than that of the Universities of Arts and Sciences. In India we should not be surprised if the professors, lecturers and instructors of the Colleges of Engineering and Technology are in the same predicament *vis-à-vis* their colleagues of the Universities. This should be known at the outset.

For India there is a special consideration. Engineering and technology are not yet well established as profession or branches of learning like the general sciences, say, physics, chemistry, medicine, etc. Professors of Engineering, especially, of Mechanical, Electrical and Chemical Engineering continue to be virtually unknown categories. Naturally, therefore, in the Calcutta, or for that matter, the Indian *milieu* the Jadavpur teachers cannot get easily established as social figures or academic and scientific personalities. This is another consideration about Jadavpur College which should be taken for granted.

Then, again, for four decades the salaries offered by the N.C.E. were invariably lower than those at the Universities, even to persons of the same qualifications, Indian or foreign. Other circumstances remaining the same, the man with the higher wage is, all the world over, automatically rated to be more brilliant, efficient, qualified or expert than the one with a lower. This consideration works quite effectively against the teaching *corps* of Jadavpur in the socio-scientific sphere. Interhuman relations are in the last analysis dominated by money. *Rupaiyocracy*, the regime of the Rupee, is eternal and universal in the social *Gestalt*.

So far as the internal society of Jadavpur College is con-

cerned, it is to be understood that engineering as a science can as a rule be properly taught in the main by those who have foreign (Eur-American and Japanese) training at college and factory. Foreign-schooled and foreign-factoried teachers are, therefore, bound to be at premium in the interhuman relations of the Jadavpur Campus. But it would be wrong to suppose that they command the monopoly in qualifications, efficiency, practicalness, organizing ability, devotion to work, patriotism, or self-sacrifice.

Students and their guardians know some of the Instructors, Lecturers and Professors who possess nothing but the Jadavpur and Calcutta University qualifications to be very brilliant in theory and practice as well as immensely devoted to studies and collegial duty. Those who have never visited foreign countries belong in certain instances to the best and the finest in the world both as teachers as well as men.

Several recent Jadavpurians, e.g., those of the Classes of the last 7 or 8 years (1938-45) report that they cannot forget their teachers of mathematics, heat, light and electricity in the first year class. Some of the Instructors and Lecturers are admired by them for their devotion to teaching and pursuit of knowledge. In the Workshop also they found that even those who had not been in foreign countries had a very good hand in practical work.

CHAPTER V

Administration

The Managing Committee of Jadavpur College for 1945 is constituted as follows : 1. Justice Charu Biswas, M.A., B.L., C.I.E. 2. Nalini Sarkar (Insurance-Man). 3. Satyananda Bose, M.A., B.L. (Advocate), 4. Kiron Roy, B.S. (Mass. Inst. Tech., Boston), Electrical Engineer and Industrialist.

5. Principal Dr. Triguna Sen, Dr. Ing. (Munich), Mechanical Engineer.
6. Prof. Dr. Satish Bhattacharya, M.Sc. (Cal). Dr. Ing. (Berlin), Mechanical Engineer.
7. Prof. Dr. Hiralal Roy, A.B. (Harvard), Dr. Ing. (Berlin), Chemical Engineer.
8. Prof. Hem Guha, B.Sc. (Edin.), G.I.E.E. (London), Electrical Engineer.
9. Sasanka Bagchi (Engineer and Industrialist).
10. Prafulla Banerjee (Engineer and Industrialist).
11. Asst. Prof Jagat Paul (Chemist).
12. Prof. Sudhir Chakravarti, B.S. (Worcester), M.S. (Michigan), Mechanical Engineer.
13. Hari Bhaumik, B.E. (Roorkee), O.B.E., Electrical Engineer.
14. Sachin Bandopadhyaya, B.Sc. (Glasgow), Mechanical Engineer.
15. Rai Bahadur Naren Mitra, O.B.E. (Civil Engineer).
16. Prof. Baneswar Dass, B.S.Ch.E. (Illinois), Chemical Engineer.
17. Prof. Manmatha Chakravarti, B.Sc. (Calcutta), B.S. (Worcester), M.S. (Purdue), Electrical Engineer.
18. Prof. Dr. Jatin Basu, Dr. Ing. (Berlin), Mechanical Engineer.
19. Rashbehari De, Member, *Verein Deutscher Ingenieure* (Association of German Engineers Berlin).
20. Sudeb Datta (Electrical Engineer).
21. Sudhir Datta (Engineer and Industrialist).
22. Suren Bose, A.B. (Stanford), M.Sc. (Calif.), Chemical Engineer and Industrialist.
23. Dhiren Sen, M.L.A. (Glass Manufacturer).
24. Sisir Mitra (Engineer and Industrialist).
- 25-29. Calcutta Corporation Councillors.

Of the 29 members of the Managing Committee, only 2, namely, the first and the third are non-engineering, non-industrial and non-scientific. One is an insurance-man. The five representatives of the Calcutta Corporation are more or less businessmen. All the rest are engineers, employed either academically as professors or in industry and commerce. It is not unreasonable to observe that the administrative body is almost as technical, professional and industrial as it can possibly be. It is quite businesslike to have the legal profession represented on the Committee by a Judge and an Advocate. The position is the exact antipodes of that in

1906-08 when the number of technical men on the governing body was zero.

It may be suggested at once for future guidance that under no circumstances should the management of the College be diluted with larger doses of representation from the legal or zamindari profession.

The constitution of the Executive Committee of the National Council of Education for 1945 is as follows : 1. Dr. Bidhan Roy, M.D., M.R.C.P., F.R.C.S. (England), Medical Practitioner, 2. Nalini Sarkar (Insurance-Man), 3. Satyananda Bose, M.A., B.L. (Advocate), 4. Brajendra Roy-Chowdhury (Zamindar), 5. Justice Charu Biswas, M.A., C.I.E., 6. Principal Dr. Triguna Sen, Dr. Ing. (Munich), Mechanical Engineer, 7. Kiron Roy, B.S. (Mass Inst. Tech. Boston), Electrical Engineer, 8. Sudhir Datta (Engineer and Industrialist), 9. Kshitish Datta (Manager of Landed Estates), 10. Barrister Snehansu Acharya (Zamindar), 11. Ajen Ghosh, B.L. (Advocate), 12. Rama Prasad Mukerjee, M.A., B.L. (Advocate), 13. Atul Datta (Engineer and Industrialist), 14. Hari Bhaumik, B.E. (Roorkee), O.B.E., Electrical Engineer, 15. Sachin Bandopadhyaya, B.Sc. (Glasgow), Mechanical Engineer, 16. Suren Datta, B.Sc. (Glasgow), Engineer and Industrialist, 17. Prof. Dr. Benoy Sarkar, M.A., Dr. h.c., Economist, 18. Prof. Purna Biswas, M.Sc. (Physicist), 19. Prof. Suren Roy, M.E.E. (Harvard), Electrical Engineer, 20. Sachin Datta, B.Sc. (Chemical Engineer and Industrialist), 21. Amar Haldar (Electrical Engineer and Industrialist).

Ten out of these twentyone members are engineers and men of science employed in teaching or in industrsy. The proportion of non-engineering men is somewhat large. But the N.C.E. has some non-engineering and non-technical interests also. The "General Department" has to deal with what is usually called culture. This explains perhaps why a some-

what large percentage of the membership of the Executive Committee happens to be non-technical. A change towards a relatively greater dose of technification or *mistrification* may not be out of the question in future.

On the Executive Committee there should always be a place for a medical practitioner and a place for a practising lawyer. It is questionable whether a layman like the present author (No. 17) should be there.

Those parties who are by right entitled to nominate members on the Executive Committee of the N.C.E. as their representatives may be advised in a friendly manner to depute only such persons as are academic and/or professional engineers and industrialists.

All the same, the position today is much superior to that a few years ago, and of course, infinitely so to the condition of pioneering days (1906-18).

The change in the occupational or professional character of the members of the governing bodies within the last forty years is to a considerable extent an index to the socio-cultural transformation of the Bengali people. The industrial bourgeoisie is replacing the zamindari (feudal) bourgeoisie and barristocracy (legal bourgeoisie) in the public life of the country. Medieval landed capitalism and the aristocracy of advocates are giving way to industrial capitalism and the regime of the technocratic expert. Such transformations have of course taken place in England, Germany and the U.S.A. over a generation and a half ago. The leadership of Bengal is at length passing to some extent into the hands of engineers, technologists, captains of industry and businessmen.

It is significant to observe that in the two lists analyzed above seven engineers are possessors of N.C.E. degrees. Sasanka Bagchi is A.M.E.E. (Jadavpur). So also are Sudeb Datta, Sisir Mitra and Amar Haldar. Sudhir Datta, Atul Datta and Sachin Datta posses the A.M.Ch.E. (Jadavpur)

diploma. Prafulla Banerjee is also a Jadavpurian. The N.C.E. has started contributing its own scholars (alumni) to the administration of its College, and is getting "alumnified." This alumnification should be a matter for congratulation to the founders and present governors.

CHAPTER VI

Finance

The financial basis of the National Council of Education may be exhibited in a few words. According to the *Annual Report for 1944* (p. 29) the balance sheet as at 31 December 1944 gave the total figure as nearly Rs. 2,852,000. Some of the important properties covered by this amount were worth as follows (in round figures) :

<i>Items</i>	<i>Rs.</i>
1. Jadavpur Construction (Buildings and Lands) ...	573,000
2. Pavilion ...	8,000
3. Old Boys' Home ...	7,000
4. Gymnasium ...	11,000
5. Plant and Machinery ...	93,000
6. Apparatus and Appliances ...	65,000
7. Furniture ...	26,000
8. Library ...	48,000
9. Machineries, Tools and Accessories (Manufacturing Department) ...	20,000
10. Agriculture Department ...	10,000
Total ...	861,000

The total of these ten items, Rs. 861,000, may be regarded as the value of the major portion of the fixed capital, so to say, of the N.C.E.

The values of the chief investments at December 1944 may be indicated as follows (in round figures) :

	Items	Rs.
I.	N.C.E's Government Promissory Notes and Port Trust Debentures	... 131,000
II.	Provident Fund	... 127,000
III.	Hindu Religious Education Fund	... 17,000
IV.	Seven Prize and Stipend Funds	... 9,000
V.	Suren Ghosh Memorial (Travelling Fellowship) Fund	... 21,000
VI.	Sinha Fund	... 32,000
VII.	Investment in Joint Stock Companies	368,000
		<hr/>
	Total ...	705,000

These seven items of chief investment were worth something above Rs. 700,000 (pp. 25-27).

The total expenditure on the Technical Department for the year ending 31 December 1944 was Rs. 296,000 (p. 37). A few important items are indicated below (p. 34) :

	Items	Rs.
1.	Teaching Staff	... 117,000
2.	Auxiliaries of the Teaching Staff	... 43,000
3.	Power and Materials	... 37,000
4.	Repairs	... 12,000
		<hr/>
	Total ...	209,000

It is interesting to observe that this total of Rs. 209,000 was covered to a considerable extent by fees derived from students which totalled nearly Rs. 179,000 (p. 35).

The figure, Rs. 117,000, as the total salary of the teaching corps, is worth noticing. We have seen that the teaching staff comprises 76 persons. One is an Emeritus. A few are

honorary and part-time. The salaries of some of the members of the "Humanities" come from the General Department. We may then take 65 as the number of teachers of the Technical Department maintained as full-time employees by an annual salary bill of Rs. 117,000. This implies, say, Rs. 1,800 per head per year, i.e., an average monthly salary of Rs. 150.

From the Budget Estimate for 1945 we get the more important six sources of income described as follows (in round figures):

		1943	1944	1945 (Budget estimate)
1.	Brajendra Roy-Chowdhury Endowment Fund	25,000	15,000	45,000
2.	Subodh Mallik Endowment Fund	3,600	3,600	3,600
3.	Rashbehari Ghosh Fund	51,000	41,000	45,000
4.	Fee from Students	152,000	184,000	176,000
5.	Calcutta Corporation Grant	27,000	x	60,000
6.	Government Grant for training of War Technicians	7,500	4,700	5,900
	Total	266,100	248,300	335,500
	Grand Total of All Receipts	413,000	395,000	584,000

The actual receipts for 1943 were 266,100 and for 1944 Rs. 248,300. For 1945 the expected receipts were valued at Rs. 335,500. Other sources of income have not been detailed in the above statement.

CHAPTER VII

The Jadavpur Campus

The changes in the local habitation and name of Jadavpur College may be chronologically indicated as follows :

1906 June—1907 June : Bengal National College, 191/1, Bowbazar Street, Calcutta.

1906 June—1912 June : Bengal Technical Institute, 92, Upper Circular Road, Calcutta.

1907 July—1910 May : Bengal National College, 166, Bowbazar Street, Calcutta.

1910 May—1912 May : Bengal National College amalgamated with Bengal Technical Institute under the National Council of Education : 92, Upper Circular Road, Calcutta.

1912 June—1924 May : Bengal National College and Technical Institute : Panchavati Villa, Muraripukur Road, Maniktala (Calcutta).

1924 June : Bengal Technical Institute, located and housed at Jadavpur near Calcutta.

1929, May : Re-named College of Engineering and Technology, Bengal, popularly called Jadavpur College, Calcutta.

The area of the Jadavpur College Campus is nearly 200 bighas (some 66 acres). The complex of buildings is described below :

1. The Main Building : three-storied. Floor space : 39,000 sq. ft.
2. Mechanical Engineering Laboratory and Power Plant. Floor space : 15,000 sq. ft.
3. Workshops (Corrugated Sheds). Floor space : 30,000 sq. ft.
4. Foundry and Smithy (Corrugated Sheds).
5. Store-shed.
6. Two-storied Building comprising :

(i) Electrical Engineering Laboratory on the ground floor. Floor space: 12,000 sq. ft.

(ii) Physics Laboratory on the first floor. Floor space: 10,000 sq. ft.

7. Chemical Engineering Laboratory. Floor space: 15,000 sq. ft.

8. Chemical Technology Building. Floor space: 8,000 sq. ft.

9—10. Hostels for students: 2. Accommodation for 90 boarders.

11. Dining Hall for students.

12—16. Staff Quarters: 5.

17. Two-storied Building for the Old Boys' Home.

18. The Pavilion of the College Sporting Club. Floor space: 4,000 sq. ft.

The Campus has been provided with a *jheel* (artificial lake). It is 600 ft. by 175 ft. by 25 ft. (depth) and is furnished with a 30 ft. wide metalled landspace. There is a tube-well (6 in. diameter) 275 ft. deep which supplies water at the rate of 8,000 gallons per hour. Coal gas is supplied to the College Laboratories by Oriental Gas Co. Ltd. of Calcutta. A 50 kw. steam engine and a 55 kw. oil engine are maintained by the College for the supply of water and light.

Power, light and water for the Workshops, Laboratories, College buildings, Hostels and Staff quarters etc., are supplied from the Power Plant. It consists of two engines: (1) a Crude Oil Engine (106 B.H.P. 4 cylinders) directly coupled to a D.C. Generator and (2) a Compound Steam Engine (75 B.H.P. Bellis Morcom) and generating set fed with steam from a Babcock Wilcox Watertube Boiler and other accessories.

Spacious grounds have been fitted up for games and sports. Students take part in cricket, football, hockey, tennis and athletics. Swimming is practised in the *jheel*.

CHAPTER VIII

The Alumni (Old Boys) Association

The hold of the N. C. E. and Jadavpur College on the Jadavpurians is extensive and profound. The Alumni (Old Boys) Association was established on the American model in 1921 with Dr. Abinash Bhattacharya, Ph.D. (Berlin) of Techno-Chemical Laboratories, Konnagar, as President and Professor Hiralal Roy, A.B. (Harvard) as Secretary. Since then the "old boys" have been coming together regularly on the Campus several times a year. The Alumni Association functions for seasonal sports, musical entertainments, industrial exhibitions, *tête-à-têtes*, and public conferences. It has branches at Jamshedpur (Bihar) and Digboi (Assam). Recently the old boys have raised from among themselves and their friends nearly Rs. 100,000 for their *Alma Mater*. The next year,—the year of the Silver Jubilee of the Association,—they propose to collect the sum of Rs. 200,000. Certainly, this is culture and spirituality with vengeance,—among engineers, technocrats, mis trified businessmen, and materialists.

Some substantial contributions have come from Jadavpurians as follows: Atul Datta Rs. 7,000, Prafulla Banerjee, Rs. 6,600, Suren Datta, Rs. 5,000, Kiron Roy, Rs. 3,000, Professor Hiralal Roy, Rs. 3,000, Professor Suren Roy, Rs. 2,900, Sachin Datta, Rs. 1,300, Professor Triguna Sen, Rs. 1,250, Hemen Roy, Rs. 1,250, Bhupen Banerjee, Rs. 1,000, Professor Sudhir Chakravarti, Rs. 1,000, Sachin Saha, Rs. 600 and Bankim Mitra, Rs. 550.

Donations of Rs. 500 each have been made by other Jadavpurians, e.g., the Classes of 1925, 1926 and 1935, as well as individuals like Atul Bose (Painter), Akul Lahiri, Amal Datta, Kanti Datta, Satis De, Dr. Suresh Roy, Sudeb Datta, Amar Mukerjee, Himangshu Sinha, Professors

Satis Bhattacharya and Hem Guha, Nripen Roy, Ratan Datta, Bholanath Kumar, Bimal Roy, Sasanka Bagchi, Sisir Mitra, Subhendu Sanyal, Amar Haldar, Sudhir Ghosh, Chandra Niyogi and others.

It is an inspiring and noble cry the Alumni Association has raised. "A month's income as gift to the *Alma Mater*" is the basis on which Jadavpurians are being urged to donate.

The Alumni Association has established several loan scholarship funds, the oldest going back to 1929. The Loan Scholarship Fund is at present valued at nearly Rs. 4,000. It is being increased to Rs. 10,000. The Association intends to collect likewise Rs. 3,000 in order to perpetuate the memory of Sarat Datta *Diplom-Ingenieur* (Berlin-Charlottenburg), the first salaried Principal of Bengal Technical Institute (1909-10). Strictly speaking, the first Principal (Hony.) was Pramatha Bose the geologist (1906-08).

In 1939 a Pavilion was constructed by it at a cost of Rs. 9,000 and the Old Boys' Home, of Rs. 8,000. The securing of jobs for fellow-Jadavpurians has been one of its mentionable activities. A very valuable work attempted by it is the indexing of members' names on cards and the compilation of the *Alumni Register*. The *Alumni Register*, if and when it is published, will serve as an objective record not only of the achievements of the National Council of Education but to some extent of the techno-industrial exploits and commercial adventures of the Bengali people as well. The history of Jadavpurians is in a considerable measure the history of Bengali industrialism.

The National Council's original spirit of self-sacrifice and work for the motherland has not been lost on Young Jadavpur. The Jadavpurians of today have been continuing the tradition with which they came into contact in their younger days. Jadavpur College does not have to be less proud of its boys

than of its fathers. The ideas of 1905 are living in the men of 1945.

In regard to the positive contributions of the Alumni Association to the N. C. E. it is possible to single out two important movements or periods. During 1927-33 it was the organizing activities and publicity campaign of some of its members that aroused the patriotism and educational enthusiasm of the city fathers, the Councillors of the Calcutta Corporation, in favour of Jadavpur College and enabled them to come forward with annual grants of Rs. 30,000 and a non-recurring capital grant of Rs. 57,000. Secondly, since 1937 the Alumni Association has been exhibiting a new type of interest for their *Alma Mater* by organizing from among themselves and their business colleagues charities, donations and benefactions which would amount to some Rs. 300,000 by 1946.

For nearly a quarter of a century the Alumni Association has been working for the improvement of the financial, pedagogic and social conditions of the *Alma Mater*. Jadavpurians have been showing a rare example to the school-going folks and the academicians of India. Such devotion to *Alma Mater* is virtually unknown among Indian students of the last three generations.

While making a survey of the forty years of Jadavpur College or rather of the N. C. E. it is worth while to call attention to this signal fact. The work that these sturdy and strenuous Jadavpurians have been organizedly doing for their *Alma Mater* is extremely substantial. The amount of money collected upto now or targeted for the next year is not the chief item of consideration. There is something over and above this materialistic fact, which, in any event, is quite mentionable. There is a profound fanaticism, madness or spirituality in this organized attempt.

It is to these Old Boys that the N. C. E. owes a large

and growing number of friends and donors among the industrialists and commercial people. The enthusiasm and tenacity exhibited by some of the members of the Alumni Association between 1927 and 1933 and again between 1937 and 1945 in the matter of enlisting sympathy and co-operation for the *Alma Mater* are exceedingly laudable. One may legitimately ask if there is any public institution in India under national auspices which can claim for itself such an organized body of benefactors and well-wishers. It is doubtful, again, if even during the epoch of the glorious Bengali revolution (1905-08) the national education movement obtained from any patriots of those days—outside the groups of original founders and patrons—the kind of active co-operation such as is being offered to the N. C. E. by the Alumni Association in recent years. Like the Rashbehari Ghosh Endowment of 1921 the Alumni Association's activities of 1927-33 and 1937-45 constitute another of the greatest single forces in the life-history of the N. C. E. The authorities of the national education movement have found the most powerful and the most voluntary allies in these new explorers, pathfinders and adventurers—the Old Boys of Jadavpur—in the cause of education for *mistrification*, factorification and technocracy combined with culture and humanism.

Some of the best products of the National Council are embodied and organized in the Alumni Association. (President: Professor Emeritus Suren Roy, Secretary: Professor Hem Guha, Treasurer: Professor Baneswar Dass). The culture-sense, patriotism and spirituality of the fathers of the Bengali revolution of 1905 could not find better representation under modern conditions than in the individual and joint activities of these their sons and grandsons. *Putradichchhet parajayam* (From the son one should desire defeat), says the age-long Indian maxim. It is to the Alumni Association that the N. C. E. has considered it worth while to make over

charges in decent proportions. Jadavpurians are being entrusted with substantial—if not the sole—responsibility of carrying Jadavpur College over to the next stages of its onward and upward march. It is to the broad shoulders, strong muscles and hard-headed doggedness of young redbloods like these that the future of the N. C. E. can be trusted to a considerable extent with hope and confidence.

In 1942 the N. C. E. has conceded to the Alumni Association the right to elect representatives on the Executive, Technical and General Committees. It should be possible to explore fresh fields in which the Association's activities may be further developed for the N. C. E.'s cause. The Association can certainly be utilized by the N. C. E. in numerous ways calculated to promote its financial expansion and stability adapted to the growing needs of engineering and technological education as well as industrial research.

The administration of the N. C. E. has become "almunified", *i.e.*, come under the influence of its Old Boys to a certain extent. This alumnification has been a factor in its *renaissance*. Further doses of alumnification can but contribute to its virility and efficiency as a techno-industrial institution of higher learning.

PART II

*The Calendar of Jadavpur College in Evolution
(1905-45)*

CHAPTER I*

The Beginnings 1905-1909

1905, November 14. In the midst of the Bengali revolution (first boycott of British goods, 7 August 1905) Barrister Ashutosh Chowdhury issues a Manifesto about the students' resolution to boycott the Calcutta University.

1905, Nov. 16. Conference of Bengali publicists and educators at Bengal Landholders' Association, Park Street, Calcutta, decides upon the initiation of education (literary, scientific as well as technical) along national lines and under national control. The leaders comprise, among others, Satis Mukerjee (Dawn Society), Advocate Rashbehari Ghosh, Ex-Judge Gooroodass Banerjee, Barristers Tarak Palit, Ashu Chowdhury, Byomkesh Chakravarti, Abdul Rasul, Pramatha Mitra and Chittaranjan Das, Professors Heramba Maitra (literature), Brajen Seal (literature and philosophy), Girish Bose (botany), and Ramendra Trivedi (physics), Drs. Nilratan Sarkar, Sasi Mitra, Pran Acharya, and Radha Govinda Kar (medical practitioners), Publicists Suren Banerjee, Bipin Pal and Mati Ghosh, Attorneys Hiren Datta, Ganesh Chunder and Deva Sarvadikari, Poet Rabi Tagore, and Zamindars Subodh Mallik and Raja Peary Mukerjee (Chairman of the Conference).

1906, March 11. National Council of Education, Bengal, constituted by the Conference (Chairman : Satyen Tagore, I.C.S. retd.), at Bengal Landholders' Association. Registered June 1 (Under Act XXI of 1860).

* These five chapters of Part II are to be read along with Part VI Chapter I section 1 (Creative Forces in the Evolution of Jadavpur College 1905-45) and section 3 (Ten Dynamic Factors in the National Education Movement 1905-45).

1906, June 1. Society for the Promotion of Technical Education in Bengal established. The leaders comprise, among others, Barristers Tarak Palit and Satyendra Sinha, Dr. Nilratan Sarkar, Maharaja Manindra Nandi, (Cossimbazar), Industrialist Rajen Mukerjee and Advocate Rashbehari Ghosh.

1906, June 26. Financial Endowment for the N. C. E. registered by the donor, Zamindar Brajen Roy-Chowdhury of Gauripur (Mymensingh). Landed properties valued at Rs. 500,000.

1906, July 25. Bengal Technical Institute established by the Society for the Promotion of Technical Education.

1906, August—1907, July. Aurobindo Ghosh, B.A. (Cantab), Principal, Bengal National College, and Hem Basu-Mallik Professor of Indian History.

1906, August 10. Financial Endowment for the N. C. E. registered by the donor, Zamindar Subodh Mallik of Calcutta. Landed properties valued at Rs. 100,000.

1906, August 14. Bengal National College and School formally inaugurated in a public meeting at the Town Hall, Calcutta. Chief Speakers: President Rashbehari Ghosh (Advocate), Ex-Judge Gooroodass Banerjee, and Poet Rabi Tagore.

1906. N. C. E. supports the Jubilee Art Academy established by Painter Ranada Gupta in 1898 (Bowbazar St., Calcutta) with a monthly grant-in-aid.

1907, January 3. Professor Ambika Ukil, M.A. (economist and business organizer), founder of the Co-operative Hindusthan Insurance Co. and the Co-operative Hindusthan Bank, suggests to the N. C. E. the desirability of instituting a system of Extension Lectures.

1907, September 28. Financial Endowment registered by the donor, Zamindar Maharaja Surya Acharya of Mymensingh. Landed properties valued at Rs. 250,000.

1907. The College is visited, among others, by Bal Gangadhar Tilak (Poona), Lajpat Rai (Lahore), and Keir Hardie, the First Labour M. P. and the father of British socialism (London).

1907. Extension Lectures by Rabi Tagore on "Comparative Literature" and by Attorney Mohini Chatterjee, M.A., B.L., on "The Study of History."

1908, January. Exhibition of instruments, tools, machines and other articles manufactured in the Laboratories and Workshops of Bengal National College.
The College and the Exhibition are visited, among others, by Sir Charles Allen, Chairman of the Municipal Corporation of Calcutta, Professor Paul Bruhl of Shibpur College, and the Imperial Chinese Commissioner to Tibet and India.

1908-16. Radha Kumud Mukerjee, M.A. P.R.S., Hem Basu-Mallik Professor of Indian History.

1909, February. Second Exhibition. The College and the Exhibition are visited, among others, by Prof. W. H. Everett (Mechanical and Electrical Engineering) of Shibpur College.

1909-10. Extension lectures by Sarat Das, pioneer Tibetologist, on "India Abroad" by Dr. Ananda Coomaraswamy, D. Sc. (London) on "National Education" and "Indian Art", by Gooroodass Banerjee on "Mathematics," "Pedagogics" and "Ethics", by Hiren Datta on the "Upanishads", and by Barrister Ratan Bonnerjee on "English Literature."

CHAPTER II

The Decade 1910—1919

1910, May 25. The National Council of Education absorbs the Society for the Promotion of Technical Education and assumes the responsibilities of Bengal National College and School as well as of Bengal Technical Institute.

1910. The College is visited, among others, by E. Vredenburg, B.L., B.Sc. (Paris), A.R.C.S. of the Geological Survey of India.

1910-11, August. Seven scholars of the N. C. E. system are sent to Harvard, Yale, and Michigan Universities in the U.S.A. for studies in physics, chemistry, pharmacy, experimental psychology, economics, applied chemistry and mechanical engineering on the strength of a fund established by the present author in co-operation with Radha Kumud Mukerjee (1910). In 1911 eight scholars are sent out by the present author in co-operation with Bipin Ghosh (lawyer) of Malda through the Malda District Council of National Education (*Malda Jatiya Shiksha Samiti*). Among these American-schooled scholars Jatin Set (Physics) and Hem Das-Gupta (Mechanical Engineering) later serve Bengal Technical Institute in a teaching capacity. Besides, Hiralal Roy (Chemistry) has been Professor since 1913 and Banesvar Dass (Chemical Engineering) since 1924.

1911. The authorities of the City and Guilds of London Institute Examination commence permitting students of the Secondary Department to compete for the higher grade examination without going through the lower grades.

1911. Extension Lectures by Principal Ramendra Trivedi of Ripon College on "Electricity and Magnetism."

1912. The publication of *A History of Indian Shipping* (London) by Radha Kumud Mukerjee, and *The Science of History* (London) by the present author. The latter's *Science of Education* (London) is published in 1913 and Mukerjee's *Fundamental Unity of India* (London) in 1914.

1911-12. The College is visited, among others, by Industrialist D. E. Wacha (Bombay), Sir William Wedderburn (London), Sir Vithaldas Thackersay (Bombay), A. Du Pre Denning, Superintendent of Industries and Inspector of Technical Education, Government of Bengal, Lt. Col. R. E. Atkinson, Principal, Roorkee College, Principal T. S. Dawson of Victoria Jubilee Technical Institute (Bombay), Industrialist Daji Abaji Khare (Bombay) and Dr. Man Arnama (Bombay).

1911, December 12. The Partition of Bengal undone at Delhi Durbar.

1913-14. As Professor (Hony.) of Political Science at Bengal National College and Probodh Basu-Malik Fellow (Hony.) of the N.C.E. the present author publishes, among other things, (1) Translation of the Sanskrit *Sukraniti* (Treatise on Politics, Economics and Sociology) into English, and (2) *The Positive Background of Hindu Sociology*, Vol. I. in 1913-14. Afterwards his travels and investigations in Egypt, Great Britain, Ireland, the U.S.A., Japan, China, France, Germany, Austria, Switzerland and Italy (April 1914-September 1925) become the subject matter of thirteen volumes (4,500 pages) in Bengali under the common title *Varttaman Jagat* (Modern World), published at first in monthly journals (1914-35). Another Bengali book prepared abroad during this period is published by the N.C.E. as *Hindu Rashtra Garan* (The Constitution of the Hindu State) in 1927.

During 1917-23 he delivers extension lectures at

California, Iowa, Columbia, Clark and other Universities of the U.S.A. as well as at the Universities of Paris and Berlin, and publishes his lectures in America and Europe as Professor of the N. C. E. Publications : *Folk-Element in Hindu Culture* (London 1917), *Hindu Achievements in Exact Science* (New York 1918), *Hindu Art Its Humanism and Modernism* (New York 1920), *The Political Institutions and Theories of the Hindus* (Leipzig, 1922), *The Futurism of Young Asia* (Berlin 1922), etc.

1914-18. World-War I.

1914. Indian Science Congress holds the first session. Calcutta is the venue.

1916-17. Bengal National College ceases to function for want of students. Bengal Technical Institute goes on.

1917-21. Kali Prasanna Das-Gupta, M.A., Hem Basu-Mallik Professor of Indian History.

1918, April 8-15. National Education Week is organized by the N.C.E. for publicizing its activities. Chief speakers : Sir Ashu Chowdhury and Attorney Dr. Deva Sarvadhikari.

1918. Bengal Technical Institute lends some valuable machinery to the Government for the manufacture of munitions.

1918. The Reconstruction Committee's Report is published in the *Annual Report of the N.C.E.* for 1918.

1919. The Extension Lectures Programme of the N.C.E. reorganized and placed in charge of Professors Ramendra Trivedi (Physics) and Pramatha Mukerjee (Philosophy).

CHAPTER III

The Decade 1920-29

1920-23. The second boycott of British goods is organized throughout India as an aspect of the Non-Co-operation Movement under the command of Gandhi. The Swaraj movement is started by Chittaranjan Das. Both engender and intensify the people's demand for the introduction of national control in the educational system.

1921, February. Gift to the N.C.E. from the will of Sir Rashbehari Ghosh. Landed and other properties as well as shares valued at nearly Rs. 1,600,000.

1921. Financial endowment for the N.C.E. registered by the donor, Zamindar Gopal Sinha (Bhowanipur), with the object of imparting education in agriculture. Landed properties valued at some Rs. 100,000.

1921. The Extension Lectures programme of the N.C.E. placed in charge of Professor Kali Das-Gupta (History).

1921-27. Pramatha Mukerjee, M.A., Hem Basu-Mallik Professor of Indian History. Publication : *Itihas O Abhivyakti* (History and Evolution) in Bengali.

1921. The Alumni Association of the N.C.E. established under the inspiration of Professor Hiralal Roy, A.B. (Harvard) and Jatin Set, A.B. (Harvard). President : Dr. Abinash Bhattacharya, Ph.D. (Berlin) of Techno-Chemical Laboratories, Konnagar. One of the Secretaries is Upen Ghosh of Bangiya Diasalai Karyalaya (Bengal Match-Manufacturing Works).

1922, June-August. President Sir Ashu Chowdhury's travels and investigations* in the industrial centres of Germany and visits to the *Technische Hochschulen* (Technological

* B. K. Sarkar : *Parajita Jarmani*, "Vanquished Germany after World-War I" (Calcutta 1925) and article in the *Calcutta Collegian* (Calcutta) for 1929.

Universities),—in company with the present author, who is Visiting Professor in Berlin, and the Electrical Engineer, Biren Das-Gupta of *Indo-Europäische Handelsgesellschaft* (Indo-Europa Trading Co. Berlin), a N.C.E. scholar with American (Purdue University) training. Tours organized by the German ministries of education and commerce.

1923. The authorities of the City and Guilds of London Institute Examination permit students of Bengal Technical Institute to enter for the Grade II examination in both electrical and mechanical engineering without having to pass the Grade I examination. (See 1911).

1923. Three Professors of the N.C.E. sent to *Technische Hochschule* of Berlin-Charlottenburg for Doctorate in Engineering on study-leave (Professors Hiralal Roy, Jatin Basu and Satis Bhattacharyya). The movement is an aftermath of Chowdhury's experiences in Germany.

1924, June. The College is housed in its own lands and buildings at Jadavpur.

1924. The University of Edinburgh grants recognition to Jadavpur College as satisfying the requirements for admission to the Scottish University for the purpose of graduation in engineering and mining.

1925-27. N.C.E.'s *liaison* with the Indian Science Congress initiated by the Chemical Engineer Professor Baneswar Dass's participation in the sessions at Benares (1925) and Lahore (1927) with papers on "Food Products Rich in Vitamins" and the "Prospects of Oil Industry in India".

1925-28. Dhiren Datta, M.A., Probodh Basu-Mallik Fellow. Publication: *Vedantic Epistemology*.

1925-35. The Calcutta Corporation elects Professor Baneswar Dass, B.S.Ch.E. (Illinois) as member or adviser on several Committees, e.g., the Food Committee, Workshop Committee, Chlorination of Water Committee, Fuel Committee, Gas Committee, etc., and the Bengal National

Chamber of Commerce on the Committee in connection with railway freights on oil seeds.

1926. The Alumni Association places two scholarships with the N.C.E.

1927-28. Prabhat Mukerjee, an alumnus of the N.C.E. and Librarian of Tagore's Vishwa-bharati, is the Hem Basu-Mallik Professor of Indian History. Publication : *Indian Literature in China*.

1927. The College is visited, among others, by A. T. Weston, Director of Industries, Government of Bengal.

1927. On account of social contacts with the members of the Alumni Association the Councillors of the Calcutta Corporation recognise the importance of Jadavpur College for Calcutta. The annual grant of Rs. 30,000 to the N. C. E. is initiated by the Corporation. The Mayor is the *Swarajist* Barrister, Jatin Sen-Gupta, a stanch follower, like many other Councillors, of Chittaranjan Das (1870-1925), the founder of the *Swaraj* Party and the first Mayor of Calcutta. Dr. Naren Law is Chairman of the Education Committee of the Corporation. One of the conditions is the continuation and maintenance of facilities for the study of oil-technology, sugar manufacture, soap-chemistry and the like.

1928. *Journal of the College of Engineering and Technology*, a quarterly, estd.

1928, December. Industrial Exhibition in connection with the Indian National Congress Session at Calcutta furnishes impetus to techno-industrial education in Bengal and enlists the co-operation of Jadavpur Professors.

1928-31. Mahamahopadhyaya Pandit Phani Tarka-vagish, Probodh Basu-Mallik Fellow. Publication : *Nyaya-Parichaya* (Introduction to Nyaya Philosophy) in Bengali.

1928-29. The College is visited, among others, by Professors

E. Sommerfeld (Physicist) of Munich, H. Lüders (Sanskritist) of Berlin, and H. von Glasenapp (Indologist) of Königsberg, and Pandit Jawaharlal Nehru (Allahabad).

1929, May. New name adopted for Bengal Technical Institute: College of Engineering and Technology, Bengal.

1929, August--1931, October. Travels, investigations and lectures in Europe by the present author* as Rector (Hon.) of the N. C. E. and a member of the teaching staff of the Calcutta University Post-Graduate Department.

1929-33. Bidhu Datta, M.A., Hem Basu-Mallik Professor of Indian History. Publication: *The Systems of Religious Thought in India with bearing upon its Cultural History*.

1929. Two scholars of the N. C. E. (Triguna Sen and Bata Ghosh) sent to Germany for Doctorate with the help, in part, of stipends from the *Deutsche Akademie* (German Academy) of Munich. Dr. Ghosh is later for several years Probodh Basu-Mallik Fellow and Lecturer of the N. C. E. (1937-42). Dr. Sen is at present Principal of Jadavpur College. Several other scholars of the N. C. E. receive stipends and/or other facilities in German Technological Universities and industrial concerns through the *Deutsche Akademie's* friendly services.

* For the contacts of Jadavpur College with the Engineering and Technological Colleges as well as industrial and commercial establishments of Europe see the *Journal of the Bengal National Chamber of Commerce* (Calcutta), for June, September and December, 1931. The articles, entitled "The Geneva Complex in World-Economy", "Contacts with Economic Italy," and "Industrial centres and Economic Institutions in Germany" by the present author arise on account of his travels and investigations in Europe for the second time (1929-31) while he is the editor of the *Journal* and a member of the Calcutta University's and the National Council of Education's teaching staffs. During this period he is a regular *Gastprofessor* (Visiting Professor) at the *Technische Hochschule* of Munich (1930-31) and a President of the International Congress of Population at Rome (1931).

Dr. Tarak Das, publicist and author of New York, resident in Germany off and on between 1928 and 1932, helps the N. C. E. scholars to get the support and co-operation of the *Deutsche Akademie* in this regard. The co-operation of other Indians travelling or settled in Germany is also in evidence.

1929. Professor Pramatha Mukerjee's *Itihasa O Abhivyakti* (Philosophy of History with special reference to the Culture-History of ancient India) is published in Bengali.

1929. N. C. E. commences financing the "Greater India" Society of Calcutta for the organization of twelve public lectures a year.

1929. The Alumni Association establishes a Loan Scholarship Fund with the object of helping needy boys of the final year class.

CHAPTER IV

The Decade 1930-39

1930-32. The World-Economic Depression.

1930. Two scholars of the N. C. E. (Sudhir Chakravarti and Manmatha Chakravarti) sent to the Polytechnic Institute of Worcester (U. S. A.) on the strength of a donation (\$2,000) made by Normal Marshall of Still River (Mass.), an American citizen, who is an alumnus of the same Institute. They are at present Professors of Jadavpur College in the Departments of M. E. and E. E. respectively.

1930-32. Civil Disobedience Movement throughout India has its repercussions on the Jadavpur Campus.

Several hundred students lose an academic year on account of imprisonment in connection with the movement, which is led as much by Jatin Sen-Gupta as by his rival, Subhas Bose.

1930-31. Agricultural classes started at Jadavpur College. Kedar Guha, B.A. (Ohio, U.S.A.) in charge (1931).

1930. N. C. E. finances the "Greater India" Society of Calcutta for public lectures by Professors Suniti Chatterjee, Nalinaksha Datta, Nihar Roy, Deva Ghosh, Panchanan Mitra, Probodh Bagchi and others (see 1929).

1931-37. Jogen Mitra, M.A., B.L., Probodh Basu-Mallik Fellow. Publication: *Hindu Philosophy*.

1932-39. Lectures on Banking by the present author as Hony. Professor of Economics.

1932. The College is visited, among others, by Dr. Ing. Oskar von Miller, Founder and Director-General of the *Deutsches Museum* (German Museum of Engineering and Technology) at Munich.

1933. Mahamahopadhyaya Professor Phani Tarkavagisha's *Nyaya-Parichaya* (Introduction to Nyaya Philosophy) in Bengali published.

1933. Calcutta Corporation makes a non-recurring capital grant of Rs. 57,000. The Mayor is the *Swarajist* medical practitioner, Dr. Bidhan Roy. The city fathers, as a rule, follow the principles of their leader, the late Chittaranjan Das (the first Mayor of Calcutta).

1933-38. Techno-industrial preparations for World-War II,—going on in Europe through the Five-Year Plans of Soviet Russia and the emergence of the Hitler-State in Germany,—inspire Young India to industrialism, *mistrification*, education in engineering and technology, and factorification.

1934-1942. Kali Das-Gupta, M.A., Hem Basu-Mallik Professor of Indian History. Publication: *Hindu Socialism in Bengali*.

1935. N. C. E. receives a donation from the will of the late Industrialist and Merchant, Jagannath Prasad.

1935. Industrial Exhibition at Jadavpur College of articles

manufactured by Jadavpurians. The exhibits comprise matches and match-manufacturing machineries, hosiery, belting and hosing pipes, electric fans, motor-car engine parts, electric lamps, sugar-mill machines, electric fans, batteries, soaps, inks and toilets, water-lifting device, door fittings, pencil and holders, confectionery, musical instruments, electric fittings, radio, celluloid products, • sewing machines, toilet products, and so forth.

1935. Agricultural Department in charge of Brahma Chatterjee, B.Sc., AG. (Illinois, U.S.A.).

1935. Swami Sadananda (of the Hindu Mission) lectures on Siam, Cambodia, Java, Bali and Kailas under the auspices of the "Greater India" Society financed by the N. C. E.

1935-39. The unsatisfactory features of the Government of India Act 1935 serve to intensify political discontent and awaken techno-industrial enthusiasm among *intelligentsia* and publicists. The N. C. E's educational efforts are appreciated by constructive statesmen and political leaders like Subhas Bose with whom members of the Alumni Association are in business and social intercourse.

1936, April 5. Industrial Exhibition at Jadavpur College.

The exhibits represent the products turned out by Jadavpurians. The firms are known as H. R. Bros. & Co. (match machinery), Bengal Scientific and Technical Works (gas mantles), Calcutta Fan Works, Stadco Stores (medicines), Jadavpur Engineering College (agricultural machineries, sewing machines, load resistance platings, soaps), Karuna Industries (lozenges, chocolates), Dhar Mandal Bros. (machineries, motor parts, instruments), National Soap and Chemical Works, Sun Knitting Mills, Bangiya Diashalai Karyalaya (matches), Jadavpur Soap Works, Bharat Battery, Nath's Brassware Factory, Calcutta • Celluloid Works, Flood Lights Co.

1937-42. Dr. Bata Ghosh (N. C. E. alumnus), Dr. Phil. (Munich), Dr. es Lettres (Paris), Probodh Basu-Mallik Fellow. Publications: Papers in Bengali on *Vijnana-Vada*, Vasuvandhu, God in Buddhist Philosophy, *Atma-Vada* in Nyaya Philosophy, *Sankhya*, Jaina Philosophy, and so forth, published in *Parichaya* and *Sri Bharati* (monthlies).

1937-41. Several members of the Alumni Association (Professors Hiralal Roy, Suren Roy and others) interest themselves in the construction of the Pavilion and the Old Boys' Home. Justice Charu Biswas, Vice-President of the N. C. E., is Chairman of the Sub-Committee.

1937-39. Young Jadavpur is ideologically influenced by the movements of Subhas Bose, political leader, whose personal and social contacts with the Alumni Association and the Committees of the N. C. E. tend to encourage industrial education under national control.

1938. Agricultural Department reorganized and placed in charge of Mohit Das-Gupta, B.Sc. (Cal.), B.Sc. (Wales).

1938. "History of the National Council" published in a special number of the *Journal of the College of Engineering and Technology*.

1938. Indian Science Congress celebrates the Silver Jubilee at Calcutta, Jadavpur College participating.

1939-40. Donation from Sja. Jayasri Ghosh, widow of Suren Ghosh, Chief Electrical Engineer of Tata Iron and Steel Co., to commemorate her husband: Rs. 20,000.

1939. Agricultural Department in charge of Biren Mandal, B.Sc. (Wales).

1939. The Director-General of Posts and Telegraphs recognises the diplomas of Jadavpur College in mechanical and electrical engineering for admission to the examination for recruitment to the grades of (1) Engineering Supervisors

and (2) Assistant Foremen, Examiners and Instrument Testers.

1939. The Defence Department of the Government of India recognizes the graduates of the Chemical Engineering Course (Notification No. 816, 24 June 1939).

1939, April 6. Students' Strike is met by the authorities closing the College indefinitely. The strike is called off by the students on May 14. It brings out "prominently some of the undesirable features of the situation", says the *Annual Report* for 1939 (p. 7). A Special Committee with Dr. Shyama Prasad Mukerjee as Chairman is constituted to look into the affairs of the College and the N. C. E. in a comprehensive manner (July 1939).

An Experts' Committee with Sj. Hari Bhaumik, B.E., (Roorkee), late Electrical Engineer-in-Chief, Posts and Telegraphs, Government of India, and Professor Purna Ganguly, B.Sc. (Glasgow), late of Shibpur College, is appointed by the Special Committee to report on the internal working of the College, the courses of instruction, etc. (November 1939).

1939, September 1. World-War II commences.

CHAPTER V

The Period 1940-45

1940-45. World War II (September 1939—September 1945).

1940. The N. C. E. finances the "Greater India" Society of Calcutta for a number of public lectures, e.g. by Sarasi Saraswati, M.A., on the Art of Paharpur, Professor Nihar Roy on "Wall Paintings of Pagan Burma", Professor Suniti Chatterjee on "Sanskrit in Asia", T. M. Ramchandran on "South Indian Art", Kunja Goswami, M.A.,

on "Bangarah Excavations" and Professor Jiten Banerjee on "Some Brahmanical Cult Deities and their Emblems on Early Indian Coins and Seals."

1940. The Students' Union of Jadavpur College is recognized by the N. C. E.

1940-42. Professor Kali Das-Gupta delivers lectures on diverse aspects of Rural Bengal.

1940, July. The Bhaumik-Ganguly Report in the Working of Jadavpur College (in typoscript).

1941, February. Daily attendance of not less than seven periods at College is enforced on all full-time employees by the N. C. E.

The N. C. E. accepts many of the recommendations of the Special Committee and Experts' Committee in regard to changes in the constitution of the Council and administration of the College as well as the curriculum of studies. These Committees were appointed in 1939.

1941. N. C. E. obtains a gift of Rs. 5,000 from Messrs. Arya Dharma Bhandar Ltd.

1941, April. A special department for the training of war technicians (*mistris*) inaugurated with grant in aid from the Government.

1941, December. Pavilion constructed. Covered floor space 2000 sq. ft. Formally opened by Justice Charu Biswas.

The expenses (Rs. 18,000) are met almost entirely from donations by members of the Alumni Association.

1941, December. Sachin Banerjee, Deputy Engineer, Calcutta Improvement Trust, delivers an Extension lecture on "Bombing and Necessary Civil Defence."

1941-42. The athlete and physical culturist, Bishnu Ghosh, visits the College and encourages one of his *chelas*, Banesvar Sarkar, to join it as Instructor. The *Ostad* and his disciple as well as Professors Suren Roy, Hem Guha and other members of the Alumni Association sponsor the

idea of a large gymnasium suited to the requirements of the College.

The gifts of Sj. Jugal Kishore Birla (Rs. 7,000) facilitate the construction of the Gymnasium. Engineer Patit De of P. P. De & Co., contributes about Rs. 5,000 in order to complete the building.

1941-42. Dr. Bata Ghosh, Dr. Phil. (Munich), Dr. es Lettres (Paris), Probodh Basu-Mallik Fellow. Publications on categories of Hindu and Buddhist philosophies in the monthly *Sri Bharati*.

1942. The Military and Civil authorities of the Government pay some Rs. 35,000 p.a. to the N. C. E. for the use of buildings and lands belonging to the College.

1942. Four Extension Lectures by Dr. Hrishikesh Rakshit (Calcutta University) on "Wireless."

1942. The Alumni Association gets the privilege of sending representatives to the N. C. E. Amar Haldar is sent to the Executive Committee, Sudeb Datta and Sachin Datta to the Technical Managing Committee, and Bankim Mitra and Sachin Saha to the General Managing Committee. They are all industrial engineers and/or businessmen.

1942. Manufacturing Department opened in the College Workshop on a business basis in order to furnish students with practical demonstration of commercial undertakings.

1942. The Alumni Association organizes a Finance Committee with the object of raising Rs. 100,000 for the N. C. E. President: Jatin Set, A.B. (Harvard), Secretary: Prof. Sudhir Chakravarti, B.S. (Worcester), M.S. (Michigan). Treasurer: Prof. Hiralal Roy, A.B. (Harvard), Dr. Ing. (Berlin). Kiron Roy, Sachin Datta and others of Oriental Mercantile Co. Ltd., associate themselves actively with this movement.

1942. Jadavpur College is "recognized" by the Institute of

Engineers through the friendly services of Engineer Hari Bhaumik, B.E. (Roorkee), O.B.E.

1942, August. The political *milieu* of India is influenced by the "Quit India" ideology of Gandhi and the Indian National Congress. The urges for industrialization and techno-scientific education are intensified.

Excitement prevails on the Jadavpur Campus as among entire Young India on account of the arrests of Gandhi, Azad and other leaders as well as of the "open rebellion" that follows.

1943. N. C. E. obtains gifts of Rs. 10,000 from Messrs. G. Achariya and Sons, Rs. 3,000 from Lala Bokhan Das, Rs. 1,180 from Messrs. Nursing Sahay Electric Co., Rs. 1,001 from Sj. Ramprosad Shaw, Rs. 1,000 from Messrs. Bala Bux Singhania, Rs. 865 from Messrs. Pioneer Engineering Co., Rs. 835 from Messrs. Devdatta Sargai & Sons, Rs. 750 from Messrs. Premier Engineering Co., Rs. 749 from Messrs. J. N. Electric Co., Rs. 500 from Messrs. Pravati Textile Mills Ltd., Rs. 500 from Eastern Engineering Trading Co., and Rs. 500 from Messrs. Jay Engineering Co., in addition to gifts from certain Jadavpurians.

1943, January. Dr. Basanti Nag-Chowdhury (Calcutta University) delivers four Extension Lectures on "Exploring the Nucleus of the Atom."

1943. The cataclysmal famine finds Young Jadavpur active in social service among the destitutes.

1943. Donation of over Rs. 45,000 to the N. C. E. from the Alumni Association.

1943. Dr. Triguna Sen, Dr. Ing. (Munich) appointed Professor of Mechanical Engineering and Special Administrative Officer to develop the resources of Jadavpur College.

1943-45. Lectures on Applied Geology by Dr. Shiva Deb, Dr.

es Sciences (Paris) become a feature of the Jadavpur Campus.

1943-45. Young Jadavpur, like other sections of Young India, experiences the tug of war prevalent throughout the sub-continent between the anti-British "Quit India" of the Nationalists and the pro-British "People's War" of the Communists. The tension is intensified on account of the battles in Manipur (Kohima) fought by Subhas Bose's Indian National Army against the British Armies (March-June 1944).

1943. The College is visited, among others, by Ghanasyamdas Birla, Industrialist.

1944, March 19. Convocation Address delivered by Professor Satyen Bose (Physicist) of Dacca University.

The Founders' Day Celebration presided over by Maharaja Uday Mahatab of Burdwan.

1944. Jadavpur College visited, among others, by Prof. Sir A. V. Hill, F.R.S. (London), Sir M. Visvesvaraya (Mysore), Sj. Kasturbhai Lalbhai (Industrialist, Bombay), Sir Ardeshir Dalal, I.C.S. (of the Government of India), Mme. Kamala Chattopadhyaya (Publicist, Madras) and Major Albert Mayer, Civil Engineer of the U. S. Army.

1944. N. C. E. obtains gifts of Rs. 2,500 from Mrs. Kusum Kumari Roy, Rs. 2,000 from Sardar Bahadur Sardar Indra Singh, Rs. 1,000 from Sj. Ashutosh Ganguly (Iron Merchant), Rs. 648 from Calcutta Electric Co., Rs. 621 from Pandeya Electric Co., Rs. 529 from Oriental Electric Works, Rs. 501 from Chandra & Co., and Rs. 500 from Sj. Debesh Ghosh (Tea Merchant) in addition to gifts from certain Jadavpurians.

1945, January 7. Founders' Day Celebration. Address by Mme. Sarojini Naidu as President. The slogan, "Wanted Fifty Lakhs (Rs. 5,000,000) in Five Years for

Jadavpur College", is started by the present author at this public meeting.

1945, February 25. Convocation Address delivered by Dr. John Matthai of Tata Iron and Steel Co. Dr. Bidhan Roy (Medical Practitioner), President of the N. C. E., is Chairman.

1945. Six scholars of Jadavpur College proceed abroad: (1) Amiya Chatterjee for Communication Engineering to Cornell University (Ithaca, U.S.A.) as recipient of Watumull Foundation Scholarship, (2) Gopal Sen for Machine Tools, Design and Modern Manufacturing Methods to the Carnegie Institute of Technology (Pittsburg) as G. A. Acharya scholar (Alumni Association), (3) Bimal Roy for Illumination Engineering to the Case School of Applied Science (Cleveland), (4) Mohi Mukerjee, for Communication Engineering to London as Government of India scholar, (5) Nalini Mukerjee for Chemical Engineering to London as Government of Bengal scholar, (6) Nakuleswar Saha for Electrical Engineering to London as Government of India scholar. Nos. 2 and 4 held up (down to November 22) on account of transportation difficulties.

1945, April. Oriental Mercantile Co. Ltd. (under the inspiration of Kiron Roy, Sachin Datta and others) raises for the N. C. E. subscriptions worth nearly Rs. 34,000 since 1942 from industrial and commercial firms. The Alumni themselves donate by this time some Rs. 31,000 (*Alumni Association Report, Appendices G and H*).

1945, July-August. Ten Jadavpurians get factorified as paid apprentices in the "Blue Earth" Workshop of the U. S. Army at Kidderpore, Calcutta.

1945, September. The Massachusetts Institute of Technology (Boston), the University of Michigan, the Carnegie Institute of Technology (Pittsburg) and Cornell University

(Ithaca, N.Y.) recognise the honours graduates of Jadavpur College as qualified enough to join their Post-Graduate classes (known as "Graduate Schools" in the U.S.A.).

1945, October 3-5., Principal Dr. Triguna Sen interviews the Liquidation Authorities of the U. S. Army at New Delhi (Colonels Welling, Ash and Gaynor, Captain Jones, Mr. Schleiter and others) with a view to obtaining for Jadavpur College machineries, tools, implements and scientific apparatuses from their techno-military works and factories in India.

1945, October 24-25. As a member of the Association of Principals of Technical Institutions Dr. Triguna Sen takes part at New Delhi in the deliberations of the All-India Board of Engineering Studies financed by the Government of India through the Central Advisory Board of Education (of which Dr. John Sargent is the head).

1945, October 28. Principal Triguna Sen visits the Secretary of the Board of Trustees of the Govindram Seksaria Charity Trust at Indore in order to create their interest in Jadavpur College as a worthwhile object for substantial benefactions from their Funds.

1945, November 2. At a public meeting held on the Jadavpur Campus with Dr. Anant Hari Pandya, D.Sc. (M.I.T.), Deputy Director of Military Supplies, Government of India, as President friends, colleagues and admirers of Kiron Roy, B.S. (M.I.T.), Director of Bengal Electric Lamp Works and Oriental Mercantile Company, as well as Secretary of the Managing Committee of Jadavpur College, who died on October 19 in the course of a mountaineering expedition at Zemu Glacier near Green Lake (18,000 ft.) at the foot of Kanchanjangha, organize a Kiron Roy Memorial Committee in order to raise a minimum sum of Rs. 100,000 with the object of (1) building a Kiron Roy Hostel with accommodation for

some 125 boarders, (2) completing a Hall to be called the Kiron Roy Hall on the roof of the Electrical Engineering Building with accommodation for nearly 1000 students, and (3) instituting one or more travelling fellowships for the alumni of the N. C. E. to be granted for the purpose of prosecuting higher engineering and technological studies at M. I. T. or elsewhere outside of India.

The resolution is moved by the present author. The sum of Rs. 74,000 is promised on the spot.

Chairman of the Memorial Committee : Dr. A. H. Pandya. Treasurer : Professor Hiralal Roy, A.B. (Harvard), Dr. Ing. (Berlin). Secretary : Sachin Datta, B.Sc. (Cal.), A.M.Ch.E. (Jadavpur), Oriental Mercantile Co., Ltd.

1945. The College is visited, among others, by Sir Jahangir Ghandy (Jamshedpur), Sir Sriram (Delhi), Colonels O. M. Jernigan, Albert Mayer, Ziegler, Eberlin, and Cox, Major J. J. Brown, Captains F. Schleicher, B. Cromack, and T. Galvin and Lts. Major and R. W. Chalfant of the U. S. Army. Most of the American visitors are civil engineers. Among other American visitors may be mentioned Major Max Levin (Doctor of Psychiatry), and Editor Merton Peer of the *Yanks Magazine*.

1945, November 13-16. Facilities for the factorification of Young Jadavpur are opened at the Tata Iron and Steel Works (Jamshedpur) and Bengal Steel Corporation (Burnpur) through the efforts of Professor Hem Guha, A.M.E.E. (Jad.), B.Sc. (Edin.).

1945, November 17. The Alumni Association organizes a Foreign Education Committee with the object of (1) exploring the possibilities of placing junior members of the teaching staff as Travelling Fellows or Scholarship-holders in the Technological Institutes and Engineering Colleges of the U.S.A., England, France and other foreign

countries, and (2) in other ways heightening the standard and efficiency of the *Alma Mater* with the co-operation of foreign educational and industrial agencies. Secretaries: Professor Manmatha Chakravarti, B.Sc. (Cal.), A.M.E.E. (Jad.), B.S. (Worcester), M.S. (Purdue), and Professor Hiralal Roy, A.B. (Harvard), Dr. Ing. (Berlin).

In addition to some foreign-schooled and foreign-factored Jadavpurians this Committee comprises a few non-Jadavpurians such as Dr. Rafi Ahmed, D.D.S. (Iowa), Principal, Calcutta Dental College, Sachin Banerjee, B.Sc. (Glasgow), Deputy Engineer, Calcutta Improvement Trust, Kshitish Biswas, M.S. (M.I.T., Boston), Pravati Textile Mills Ltd., Suren Bose, M.S. (Calif.), Bengal Waterproof Works Ltd., Lecturer Dr. Shib Deb, Dr. es Sciences (Paris), Geologist, Dr. Moni Moulik, D.Sc. Pol. (Rome), Indian Tea Market Expansion Board, and Dr. Amulya Ukil, M.B., M.S.P.E. (Paris), Chest Department, Medical College Hospital. Three Jadavpurians stationed outside Calcutta also belong to this Committee, namely, Karuna Guha, A.M.Ch.E. (Jad.), M.Sc. (Liverpool), Deputy Director, Planning Board, Government of India, New Delhi, Dr. Kshirod Majumdar, Ph.D. (Harvard), Tata Iron and Steel Co., Jamshedpur, and Professor Narayan Vidyarthi, A.M.Ch.E. (Jad.), M.Sc. (Liverpool) of Science College, Patna.

1945, November 21-24. Unrest prevails on the Jadavpur Campus as among the entire student community of Calcutta and the general public comprising Hindus and Muslims of all denominations and parties on account of the shooting to death of Rameswar Banerjee, a student of the Calcutta Technical School, by the Police who open fire on peaceful student processionists demonstrating in favour of the families of some of the leaders of the Indian

National Army under trial at New Delhi. "Bloody Wednesday" (Nov. 21) is the starting-point of fresh bloodshed which accounts for 36 killed and over 300 injured (as reported by the *Hindusthan Standard* and the *Ananda Bazar Patrika* on November 26). The efforts of publicists like Sarat Bose, Dr. Shyama Mukerjee, Abul Azad, Jawaharlal Nehru, Ashrafuddin Chowdhury and others help to pacify the situation. Casualties are in any case suspected as being much more than reported.

1945, November. Imperial College of Science and Technology (London) recognizes and accepts a Jadavpurian for post-graduate studies in chemical engineering.

1945, December 9. The Convocation address is delivered by Jawaharlal Nehru before an audience of over 5,000 men and women comprising American, British and French visitors. A novel feature is the procession of alumni, class by class from 1910 to 1945. It is led by the senior-most alumnus, Jatin Set (1910) A.B. (Harvard), as the bearer of the flag for his class. Flags for 1911, 1912, etc. are likewise held by the leader of each class. The procession is accompanied by music of the College Band.

PART III
Pioneering Stages
(1905-1919)

CHAPTER I

“*Pioneers, O Pioneers !*”
(1905-10)

SECTION 1

The Bengali Revolution
(1905)*

The administrative partition of Bengal into something like East Bengal and West Bengal was decided upon by the Government of India on 20 July, 1905. Protest against this measure was voiced at a public meeting held at Tagore Castle, the residence of Maharaja Jatindra Tagore. Maharaja himself as well as Maharaja Surya Acharya of Mymensingh and other prominent zamindars (landholders), lawyers and publicists took part in this meeting as at the meetings of the Indian Association and elsewhere in Calcutta between July 20 and

* For recent Bengali interpretations of the politics and culture of Bengal about the beginnings of the twentieth century see Girija Roy-Chowdhury's series of articles entitled “Sri Aurobindo” in the monthly *Udbodhan* (published by the Ramakrishna Mission), especially the issues since 1940; Jogesh Bagal: *Muktir Sandhane Bharat* (India in Quest of Freedom, 1940) and Prabhat Ganguli: *Bharater Rastriya Itihaser Khasra*, The Framework of India's Political History 1942). Benoy Sarkarer Baithake (In Meetings with Benoy Sarkar) edited by Hari Mukerjee and others, Vol. I. (1944) pp. 251-339, Vol. II. (1945), pp. 344-348, 485-487, 578-580 may be consulted for reminiscences of the national education movement and observations on Jadavpur College and Jadavpurians. See also Bipin Pal: *Indian Nationalism* (London 1909) and *My Life and Times* (Calcutta, 1932); Ambika Majumdar: *Indian National Evolution* (Madras 1916); Suren Banerjee: *A Nation in the Making* (London 1925); Prithwis Roy: *The Life of C. R. Das* (London 1927), Benoy Sarkar: *Creative India* (Lahore, 1937), *The Sociology of Races, Cultures and Human Progress* (Calcutta 1939) and *Villages and Towns as Social Patterns* (Calcutta, 1941).

CHAPTER I

“Pioneers, O Pioneers !” (1905-10)

SECTION 1

The Bengali Revolution (1905)*

The administrative partition of Bengal into something like East Bengal and West Bengal was decided upon by the Government of India on 20 July, 1905. Protest against this measure was voiced at a public meeting held at Tagore Castle, the residence of Maharaja Jatindra Tagore. Maharaja himself as well as Maharaja Surya Acharya of Mymensingh and other prominent zamindars (landholders), lawyers and publicists took part in this meeting as at the meetings of the Indian Association and elsewhere in Calcutta between July 20 and

* For recent Bengali interpretations of the politics and culture of Bengal about the beginnings of the twentieth century see Girija Roy-Chowdhury's series of articles entitled "Sri Aurobindo" in the monthly *Udbodhan* (published by the Ramakrishna Mission), especially the issues since 1940; Jogesh Bagal: *Muktir Sandhane Bharat* (India in Quest of Freedom, 1940) and Prabhat Ganguli: *Bharater Rastriya Itihaser Khasra*, The Framework of India's Political History 1942). Benoy Sarkarer Baithake (In Meetings with Benoy Sarkar) edited by Hari Mukerjee and others, Vol. I. (1944) pp. 251-339, Vol. II. (1945), pp. 344-348, 485-487, 578-580 may be consulted for reminiscences of the national education movement and observations on Jadavpur College and Jadavpurians. See also Bipin Pal: *Indian Nationalism* (London 1909) and *My Life and Times* (Calcutta, 1932); Ambika Majumdar: *Indian National Evolution* (Madras 1916); Suren Banerjee: *A Nation in the Making* (London 1925); Prithwis Roy: *The Life of C. R. Das* (London 1927), Benoy Sarkar: *Creative India* (Lahore, 1937), *The Sociology of Races, Cultures and Human Progress* (Calcutta 1939) and *Villages and Towns as Social Patterns* (Calcutta, 1941).

August 6. During the same period resolutions boycotting British goods as a political measure to counteract and undo the partition proposal were passed in public meetings of Pabna in North Bengal and of other district towns. The Chinese boycott of American goods was at this time one of the *vishwa-shakti* (world-forces) in Indian public life and culture.

The Bengali weekly of Calcutta, *Sanjivani*, edited by Krishna Mitra, took up the boycott slogan started by the people of the *Mofussil* (districts). Eventually on August 7 the boycott of British goods was proclaimed at three simultaneous mammoth meetings of the citizens of Calcutta held at Town Hall with Maharaja Manindra Nandi of Cossimbazar as the General Chairman. The resolution was moved by Naren Sen, the editor of the *Indian Mirror*. Thereby the glorious Bengali revolution declared itself born for India and the world. This was the first historic announcement of India's will to independence and freedom.

But the Partition of Bengal was formally announced at Simla by the Government of India. Protest meetings continued to be held in the *Mofussil* as well as at Calcutta, one of which was presided over by Barrister Lal Mohan Ghosh (September 22). Marwari merchants joined Young Bengal by cancelling contracts with the Manchester millowners in pursuance of the boycott resolution of August 7.

To crush the rising tide of revolutionary enthusiasm and militant nationalism among the Bengali people the Chief Secretary of East Bengal Government issued a Circular on October 10 forbidding students to join boycott meetings and sing *Bande Mataram* (the national anthem). The challenge embodied in this Circular was accepted by the masses and the classes combined. The Anti-Circular Society was established at Calcutta with Sachin Bose and Rama Kanta Roy, Japanese-trained mining engineer, as leaders. The foundation stone of Federation Hall was laid on October 16 as a mark of the

spiritual undoing of the partition in a meeting of the Calcutta public. Barrister Ananda Bose was proposed to the Chair by Ex-Judge Gooroodas Banerjee, and addresses were delivered, among others, by Publicist Suren Banerjee (editor of the *Bengalee*), Barrister Tarak Palit, and Sister Nivedita (Miss Margaret Noble, Irish) of the Ramakrishna-Vivekananda Movement. A students' meeting was presided over by Poet Rabi Tagore (October 27) at which the boycott of the Calcutta University was resolved upon in case students were persecuted and prevented from participating in the boycott agitation.

The Dawn Society (established 1902) had been functioning as an "extra-mural" Institute or Association for the promotion of moral training and general culture as well as business and commercial habits among young men under the inspiration and guidance of Satis Mukerjee. It knew how to organize the mental and moral forces generated by the political situation of the day in favour of an independent educational system on national lines. Mukerjee was in intimate contact with and behind Tagore and other public speakers. On November 2 Tagore addressed a public meeting at Field and Academy Club (house containing the flats of Mukerjee and his intimate lieutenants as well as of Brahmanandhab and Mokshada Samadhyayi), and again on November 4 at Dawn Society encouraging the audience to go in for the establishment of a National University.

While Calcutta was talking, history was being made in the *Mofussil*. The first national school was established at Rangpur in North Bengal. In direct opposition to the Government's orders compelling boys to pay a fine for singing *Bande Mataram* the guardians took the law into their own hands, and led by the senior pleader, Umesh Gupta, they started this school on 8 November 1905. The national school at Dacca was established in December 1905. On 10 April 1906 the national school of Dinajpur and on 30 April (that of

Mymensingh were established. Be it stressed that it was the people in the districts—the rural areas—that took the lead in the national education movement. The villages led, so to say; the towns and the metropolis followed. The event of Rangpur is memorable.

In the week that followed that event, fillip was furnished to the University-boycott ideology at Calcutta by Professor Mohit Sen's public lecture at College Square (9 November 1905). The boycott of schools, colleges and University was the subject matter of public addresses at Calcutta during the second week of November. On 11 November Barrister Ashu Chowdhury was the Chairman. The speakers comprised Publicists Bipin Pal and Brahmabandhab, Attorney Hiren Datta and others. On November 14 a communication was issued by Chowdhury to the publicists and educational leaders of the country in regard to the resolution of the students to boycott the Calcutta University and the Department of Public Instruction of the Government of Bengal. It was a veritable charter or manifesto for Young Bengal.

This Manifesto has become one of the historic documents of the Bengali revolution. It is in this letter that the origins of the National Council of Education, Bengal National College, Bengal Technical Institute, and Jadavpur College of Engineering and Technology are to be found.

SECTION 2

Ashu Chowdhury's Manifesto Regarding the Boycott of Calcutta University (14 November 1905)

The letter of November 14, 1905 addressed by Ashu Chowdhury from Bengal Landholders' Association, 52/4, Park Street, Calcutta, to the publicists and educators is worded as follows :

“A very large number of students has apparently

determined not to go up for the University Examinations this year. Their idea is to sever all connection with the Calcutta University, and join some educational institution under national control. There is no such institution now and the question of establishing one, if we are to provide for these students and others who are likely to follow their lead, must be at once taken up and finally determined.

"Most of us were unaware of this intense feeling amongst the student community and I for one had not realised it, nor was I inclined to believe in its existence, until last Saturday when I attended a meeting of students, at the request of Babu Hirendra Nath Datta, M.A., Premchand Roychand Scholar, one of our most sedate public men. At that meeting, consisting of over five thousand students, I felt for the first time the urgency of the matter, and I beg of you to take note of the fact and decide what we ought to do under the circumstances.

"The students believe that a large sum of money would be forthcoming to establish and support such an institution as they desire, but they are more sanguine than facts justify. So far as I am able to ascertain first hand, we may count upon six lacs, namely, 1 lac in cash, and 5 lacs in cash or, an annual income, secured on immovable property, of Rs. 20,000. In addition to this I have been assured by a friend, upon whose word the public can rely, that he can guarantee an endowment yielding Rs. 30,000 a year. We have also the possibility of getting a magnificent house, and a sum of Rupees 2 lacs provided arrangements be made for starting a technical branch. Smaller sums have also been promised, but it is difficult to estimate the amount thus available.

"There is some ground for believing that some independent institutions are willing to come under our Directorate or Board of Control.

"I have had the opportunity of ascertaining the views of some eminent friends, and, at their desire, I have the honour to invite your presence at a small meeting to be held at the above premises (52/4, Park Street, Calcutta) on Thursday, the 16th instant, at 3 P.M.

"Some distinguished students of the Calcutta University, who are able to represent the views of the community, have been invited to attend.

"Last Saturday, I found the students determined to take a decisive step on Monday, the 13th November. I was able to prevent that by promising to get our leaders to take up the matter and give it their earnest consideration. They wanted to know on Sunday if they could count upon their help and, if so, how soon they could arrive at a decision. I asked them to allow some time but they resolved to wait only up to Thursday, the 16th instant, 5 P.M.

"The situation must be faced, otherwise the result would be disastrous."

Chowdhury's Manifesto, as reproduced above, calls up the spirit of the times as dominant during the Bengali revolution. It likewise bears testimony to the fact that the elders were virtually forced by Young Bengal to establish the National Council of Education. The triumph of youth was registered in that historic document. Emotion, enthusiasm, fervour, and romantic abandon to the call of the *Swadeshi* (the indigenous and the national) inspired the old no less than the young in the pursuit of resistance against repression by Government. Revolution was in the air.

SECTION 3

*The N. C E. as the Dawn Society Writ Large
(1906-08)*

From 14 November 1905 (the date of Chowdhury's Manifesto) to 14 August 1906 (the date of the formal inauguration of Bengal National College) the history of the national education movement is virtually the biography of Satis Mukerjee. It was almost exclusively by him that the burden of moulding the new ideology into a concrete pattern was shouldered. Constructive culture-promoter as he was, nothing could be more agreeable to him than this burden. In regard to the courses of studies and pedagogic methods he held *tête-à-têtes* constantly with Ex-Judge Gooroodass Banerjee, (mathematics and education) and occasionally with Professor Brajen Seal (literature, culture-history and philosophy) Professor Ramendra Trivedi (physics, chemistry and mathematics), and Poet Rabi Tagore. So far as finances were concerned, his chief pre-occupation was with Sj. Brajendra Kishore Roy-Chowdhury of Gauripur (Mymensingh) or rather with the manager of his estates, the Sanskritist Manomohan Bhattacharya. Professor Ambika Ukil, the economist of Dacca and the founder of Hindusthan Co-operative Bank and Hindusthan Co-operative Insurance Co. at Calcutta; was almost a constant companion of Bhattacharya in interviews with Mukerjee. As for the organization of Committees and administrative organs Mukerjee was frequently exchanging views with Attorney Hiren Datta and sometimes with Barrister Abdul Rasul.

In regard to managing all these contacts it was possible for Mukerjee to draw upon the assistance of his colleagues and pupils of the Dawn Society. The more constant among them were Durga Sankhya-Vedantatirtha, the Sanskritist,

Haran Chakladar (history and anthropology), Radha Kumud Mukerjee (history and economics), Kishori Gupta (mathematics), Rabi Ghosh (philosophy and literature), and the youngest and the humblest of them all, the present author. These lieutenants of his constituted the nucleus of the teaching staff of Bengal National College, as established by the N. C. E. in June 1906. It may be said that in a great measure the National Council of Education was for some time during the pioneering stages (1906-08) but the Dawn Society writ large. Be it observed that the Dawn Society, established in 1902, ceased to function in 1906 with the establishment of the N. C. E. *The Dawn Society's Magazine* ran until 1913.

It was by affiliation with the Dawn Society's members and as friends of the Dawn Society that some of the new members of the teaching corps of Bengal National College got access into that staff. Every honorary member of the teaching staff was likewise a personal friend of Satis Mukerjee.

SECTION 4

*Technological Education at Bengal National College and School (1906-08)**

For 1906-08 the Executive Committee of the National Council of Education had the following seventeen members :

President : Dr. Rashbehari Ghosh, M.A., D.L., C.I.E.

(Advocate).

Vice-President : Maulvi Muhammad Yusuf Khan Bahadur, M.A., B.L. (Advocate) replacing Dr. Prasanna Roy (Professor of Philosophy).

* This section has to be read along with section 6 (Bengal Technical Institute 1906-08)

Treasurer: Rai Yatindra Roy-Chowdhury, M.A., B.L. (Zamindar).

Secretaries: (1) Ashu Chowdhury, M.A. (Cal.), B.A. (Cantab), Barrister, (2) Hiren Datta, M.A., B.L. (Attorney).

Other Members: (1) Sir Gooroodass Banerjee, Kt., M.A., • D.L., Ph.D., (Advocate, Ex-Judge and Educationist). (2) Byomkesh Chakravarti, M.A. (Barrister). (3) Abdul Rasul, M.A., B.C.L. (Oxon), Barrister. (4) Deva Sarvadikari, M.A., B.L., (Attorney). (5) Dr. Hem Sen, M.D. (Medical Practitioner). (6) Dr. Sasi Mitra, M.B., B.Sc. (London), (Medical Practitioner). (7) Jnan Roy, Barrister. (8) Govinda Roy, M.A., B.L. (Advocate). (9) Professor Ramendra Trivedi, M.A. (Physicist). (10) Prof. Aurobindo Ghosh, B.A. (Cantab), (Literature and Philosophy). (11) Manomohan Bhattacharya, M.A., (Sanskrit Literature). (12) Satis Mukerjee, M.A., B.L. (History and Philosophy). — — —

Nine of these seventeen men were lawyers. Two were medical practitioners. One was a zamindar (land-holder). The others were men of general culture. Nobody had any experience of industry, engineering, commerce or business of any sort. The National Council of Education wanted to function as a full-fledged University and had the ambition of imparting literary, scientific as well as technical education from the lowest (primary) to the post-graduate standard. But not a single engineer, industrialist or business organizer was called upon to function on the Executive Committee of this Council which was established as a protest against the over-literary, all-too academic, unscientific and un-industrial University of Calcutta. The socio-cultural conditions of Bengal towards the beginning of the present century were indeed unspeakably innocent of science, industry, engineer-

ing, technocracy, machinism, commerce, banking, and business organization.

From the viewpoint of 1945 Jadavpurians ought but to admire the enthusiasm and sincerity of those leaders of the Bengali revolution (1905), who without the least knowledge and experience of engineering and technology embarked upon a venture of educational reconstruction based upon and calculated to promote industrialization, "*mistrification*," and economic modernization. Be it observed that these seventeen men were some of the greatest intellectuals and sincerest patriots of the time. Hardly anybody has by character and strenuous exertions been a greater inspirer of Young Bengal than Satis Mukerjee, nobody a greater idealist and epoch-maker in politics than Aurobindo, and none a greater philanthropist and educational benefactor than Rashbehari Ghosh.

The "Faculty of Technology," constituted for 1908, comprises 29 names. Fourteen of these are the names of the most prominent zamindars (landholders). The legal profession was represented by four members and the medical by two. There were two professors of science, Ramendra Trivedi, the physicist, and Girish Bose, the botanist. The rest were journalists and publicists.

The "Board of Studies" for technological subjects was divided into the five groups: (a) agriculture, (b) manufacture, (c) commerce, (d) pedagogics, and (e) medicine. There were twenty persons on the Board of Studies for "manufacture." The landholding community offered four, the lawyers were four in number. The botanist, Girish Bose, the physicist, Ramendra Trivedi, and the geologist, Pramatha Bose, were the only men of science. There was a civil engineer, Prasanna Sen. The only industrialist or businessman was perhaps the chemist, Raj Sekhar Bose. The brain-trust of the entire Bengali people was incapable of

making a better show during 1905-08 in the matter of technological talent.

Jagadis Bose and Prafulla Roy, the two distinguished men of science employed as professors in Presidency College, were Government servants and therefore unable to join the National Council of Education even as educational advisers and scientific experts.

And yet it must be observed that technical education was compulsory in the National Council's pedagogic system even in the most elementary stage of the school. Besides, there was a special Technical Course divided into (a) Primary Standard, (b) Secondary Standard, and (c) Proficiency (Collegiate) Standard. The syllabus of the Proficiency standard was not ready by 1908 as one understands from the *Calendar 1906-08* (pp. 62, 78). It should be noted that the Mechanical, Electrical and Chemical Engineering Courses offered by Jadavpur today are the developments of what were being discussed for the Proficiency Technical Course in 1908.

For the Primary Technical Examination (scholar's age 9) held in 1907 and 1908 there were two papers on arithmetic, geometry and mensuration, two papers on drawing and surveying, and two papers on engineering and estimating. Besides, there were two examinations, one relating to carpenter's shop and the other to blacksmith's shop. At the Secondary Technical Examination (1907 and 1908) candidates (age 16) were examined in mathematics (three papers, arithmetic, algebra, geometry, mensuration, trigonometry), drawing (one paper), surveying (one paper), engineering (one paper, building materials, building construction, roads), estimating (one paper, simple culvert, simple house, earthwork in roads). Then there were examinations in carpentry as well as blacksmith's work.

The Secondary Technical Course was later made more comprehensive. The scheme comprised the following : (A) A

general course of instruction in (1) physics, (2) chemistry, (3) mathematics and (4) drawing. In all these subjects the standard was that of I.Sc. (B) A special course of instruction in (1) machine drawing, (2) mechanics, (3) steam engines, boilers, prime movers, (4) hand and machine tools, (5) pattern making, (6) brass moulding, (7) smithy, (8) turning, and (9) fitting.. This was a three-year course after the fifth standard (*i.e.* Matric level).

All these items are noteworthy in order to understand that the "Board of Studies", the "Faculty of Technology" and the Executive Committee of the National Council of Education, although mainly and essentially un-technical and un-industrial, were somehow competent enough to devise really adequate techno-industrial courses of the post-Matric Intermediate standard for young men of 16 or 17 in the interest of their *mistrification* (training as *mistris* or technicians).

(See Part I. Chapter V. Administration)

In January 1908 a small exhibition was held in the College premises of the articles, implements and apparatus turned out in the workshops and laboratories of the Scientific and Technical Departments during 1907. The exhibits were mainly of the following descriptions, as says the *Annual Report for 1907* (p.29): (1) engineering wooden patterns (cranks, brackets etc.), (2) engineering appliances, (3) cutlery, (4) drawing appliances and requisites, (5) instruments and apparatus for the physical and chemical laboratories, (6) free-hand drawings and paintings, (7) cardboard work, (8) furniture, and so forth.

The exhibition of articles manufactured in 1908 was held in February 1909. They comprised microscopes, lathes, scroll-saw, parallel vices, physical balances, spherometres, screw gauges, photometer, etc. The list may be seen in the

Appendix F of the *Annual Report for 1908*. This exhibition was opened by Maharaja Manindra Nandi of Cossimbazar.

SECTION 5

*Pioneers of "Mistrification" and Technocracy combined with Humanism and Culture (1907)**

The teaching staff of Bengal National College and School (1907) as described in the N. C. E. *Calendar for 1906-08* was constituted as follows :

Sanskrit and Indian Philosophy : (1) Chandra Nyayalankar, (2) Durga Sankhya-Vedantatirtha (Hony.), (3) Mokshada Samadhyayi, (4) Kedar Kavya-Purantirtha, (5) Satis Mukerjee, M.A., B.L. (Hony.).

Indian History and Geography : (1) Aurobindo Ghosh, B.A. (Cantab), (2) Sakharam Ganesh Deuskar (Rajput and Maratha History), (3) Bhikkhu Punnananda (Buddhist Period), (4) Durga Vedanta-Tirtha (Ramayana and Mahabharata Period), (5) Rabi Ghosh, M.A., (6) Benoy Sarkar, M.A.

European History : (1) Aurobindo Ghosh, B.A. (Cantab), (2) Radha Kumud Mukerjee, M.A., P.R.S., (3) Rabi Ghosh, M.A., (4) Prasanna Bose, M.A., (5) Satis Mukerjee, M.A., B.L. (Hony.).

Political Economy : (1) Radha Kumud Mukerjee, M.A., P.R.S., (2) Prasanna Bose, M.A., (3) Satis Mukerjee, M.A., B.L.. (Hony.).

Political Science : (1) Aurobindo Ghosh, B.A., (Cantab) (European Systems), (2) Chandra Nyayalankar (Ancient Hindu System), (3) Satis Mukerjee, M.A., B.L. (Hony.).

Arabic, Persian and Urdu : Maulvi Mainuddin.

Bengali : (1) Kshirod Vidyabinode, M.A. (Hony.).

* This section has to be read along with Section 6 (Bengal Technical Institute 1906-08).

(2) Amulya Ghosh Vidyabhusan (Hony.), (3) Sakharam Ganesh Deuskar, (4) Jayada Datta.

Pali : (1) Dhammananda Kosambi, (2) Bhikkhu Punnananda.

Marathi and Hindi : (1) Sakharam Ganesh Deuskar, (2) Baburao Paradkar.

French and German : (1) Aurobindo Ghosh, B.A. (Cantab), (2) Amulya Ghosh (Hony.).

English : (1) Aurobindo Ghosh, B.A. (Cantab), (2) Satis Mukerjee, M.A., B.L. (Hony.), (3) Prasanna Bose, M.A., (4) Radha Kumud Mukerjee, M.A., P.R.S., (5) Rabi Ghosh, M.A., (6) Benoy Sarkar, M.A.

Western Philosophy : (1) Pramatha Mukerjee, M.A., (2) Satis Mukerjee, M.A., B.L. (Hony.).

An additional professor of philosophy in 1906, the first year of the N. C. E., was Dr. Arthur R. Sarath Roy, Ph.D. (Berlin). He described himself as "Indian by nationality and Christian by faith."

Biology : (1) Dr. Indu Mallik, M.A., B.L. (Hony.), (2) Bipin Chakravarti, L.M.S., (3) Girindra Chowdhury (Laboratory Asst.).

Physics and Chemistry : (1) Kshirod Vidyabinode, M.A. (Hony.), (2) Jagadindu Roy, (3) Mani Banerjee, (4) V. K. Paranjpye, L.E.E., (5) Haran Chakladar, M.A., (6) Nara Biswas, B.A., (7) Ramesh Bhattacharya (Laboratory Asst.), (8) Hem Ghatak (Laboratory Asst.).

Mathematics : (1) Mahendra De, M.A., B.Sc., (2) Kishori Gupta, M.A., (3) Arabinda Prakash Ghosh, M.A.

Drawing : (1) B. B. Ranade, L.M.E. (Lecturer in Machine Drawing), (2) Kshitish Mukerjee (Art Teacher and Mechanical Engineering Draughtsman).

Kindergarten : Nirod Bose.

Technical Department : (1) B. B. Ranade, L.M.E. (Superintendent and Lecturer in Mechanical Engineering),

(2) V. K. Paranjpye, L.E.E. (Lecturer in Electrical and Mechanical Engineering), (3) Nagen Rakshit (Foreman Instructor).

Commercial Department : (1) Kailash Sarkar, (2) Bhabani Baral, (3) Prosad Guin, (4) Jnanada Chakravarti.

Only one name of the 1907 staff is still to be found among the *personnel* of Jadavpur College in 1945. It is that of Jnanada Chakravarti, a teacher of the Commercial Department and a librarian of those days, who is today an employee in the office.

The present author's indebtedness to the teaching *corps* of 1906-08 is worth noticing. A personal item may be introduced here.

I became a member of the College teaching staff for History and English in 1907. At the same time I joined the classes as a regular student. My first lessons in Pali I got from Dhammananda Kosambi, to whom I likewise owe my introduction to Marathi. With Chandra Nyayalankar I read the *Ramayana* and with Durga Sankhyatirtha the *Kathopanishad*, both in the Sanskrit original. In other words, I was a student of the three Proficiency Classes in Language, History and Philosophy. These introductory studies have been of material help in the preparation of my *Positive Background of Hindu Sociology* (Allahabad, 4 volumes, 1913-37), as well as *Creative India* (Lahore 1937).

The N. C. E. *Calendar* for 1906-08 gave the list of Directors of Studies as follows :

<i>Directors</i>	<i>Subjects</i>
1. Mahamahopadhyaya Chandra Tarkalankar	Sanskrit Literature and Philosophy.
2. Maulvi Muhammad Yusuf Khan Bahadur, M.A., B.L.	Arabic, Persian and Urdu.

	<i>Directors</i>		<i>Subjects</i>
3.	Hon'ble Dr. Rashbehari Ghosh, M.A., D.L., C.I.E.	...	English.
4.	Sir Gooroodass Banerjee, Kt., M.A., D.L.	...	Mathematics.
5.	Dr. Prasanna Roy, D.Sc.	...	Philosophy.
6.	Raja Peary Mukerjee, M.A., B.L., C.S.I.	...	Economics.
7.	Suren Banerjee	...	History.
8.	Rabi Tagore	...	Bengali.
9.	Ramendra Trivedi, M.A., P.R.S.	Physical Science.	

It is clear that no Director of Studies was announced for technology or engineering.

The technological and engineering departments had hardly been started in 1908 when the *Calendar* was published. Some forty persons were on the teaching staff but not more than three belonged to the technical department. In biology, physics and chemistry also there were only ten connected with teaching. Among the teachers of the technical department two were Deccanis (Marathas). B. B. Ranade, L.M.E. (Victoria Technical Institute, Bombay) was lecturer in mechanical engineering and V. K. Paranjpye L.E.E. (Victoria, Bombay) in electrical and mechanical engineering. Ranade was Superintendent of the Workshop. The third man in the department was a Bengali, Nagen Rakshit. He was Foreman Instructor. For education in engineering and technology, then, Young Bengal had to depend in 1907 on two non-Bengali Indians as teachers. There were very few Bengalis available at that time as teachers of mechanical and electrical engineering. (See *Infra*, Section 6. Bengal Technical Institute 1906-08).

The Foreman Instructor, Rakshit, was a young man of 23-24 with experience of work in the E. I. Ry.'s workshops at Jamalpur. He may be regarded as the first Bengali teacher

of Bengali youths in a modern college of technology. In those days we Bengalis were unfamiliar with mechanical or electrical engineers. It is interesting to recall that myself, several years younger than Rakshit as I was, used to look upon him as a veritable "technical genius", a machine-man, a lathe-expert, a person of extraordinary merit. Perhaps it is relevant in this connection to add that Rakshit has since then exhibited his *forte* in machines and engines by undertaking iron foundries and engineering works of substantial dimensions at Tatanagar and elsewhere. Rakshit is by all means a pioneer of Bengali industrialism, "*mistrification*" and technocracy.

It has to be remembered that the entire educational effort was financed exclusively by charities of individual benefactors. Some of the annual subscriptions during 1908 are enumerated below :

(1) Barrister Ashu Chowdhury : Rs. 3,000. (2) Attorney Hiren Datta : Rs. 3,000. (3) Barrister Byomkesh Chakravarti : Rs. 3,000. (4) Kumar Arun Sinha (Zamindar) : Rs. 2,500. (5) Maharaja Manindra Nandi : Rs. 2,000. (6) Advocate Dr. Rashbehari Ghosh : Rs. 1,620. (7) Yatin Roy-Chowdhury : Rs. 1,200. (8) Gooroodas Banerjee (Ex-Judge) : Rs. 600. (9) Dhannulal Agarwala (Merchant) : Rs. 300. (10) Barrister Jnán Roy : Rs. 200. (11) Pannalal De : Rs. 120. (12) Baimuntha Sen (Advocate) : Rs. 100. (13) Dr. Suresh Sarvadikari (Surgeon) : Rs. 100. (14) Barrister Abdul Rasul : Rs. 100.

The total landed properties endowed by generous donors for the National Council of Education were worth Rs. 850,000 in 1908. The endowments were as follows :

Rs.

1. Brajendra Kishore Roy-Chowdhury (Zamindar of Gauripur, Mymensingh) ...	500,000
2. Maharaja Surya Kanta Acharya (Mymensingh)	250,000

3. "Raja" Subodh Chandra Mallik (Calcutta) 100,000

The annual income from these estates was as follows :

Rs.

(i) Roy-Chowdhury	...	Rs. 20,000
(ii) Maharaja Mymensingh	...	,, 10,000
(iii) Mallik	...	,, 3,600
Total	...	33,600

The self-sacrifice and patriotic idealism of the pioneers in the field of education for industrialism, technocracy and *mistrification* combined with culture and humanism cannot but arrest the attention of observers.

SECTION 6

Bengal Technical Institute (1906-08)*

The Executive Committee of Bengal Technical Institute was constituted for 1906-08 as follows :

President: Hon. Dr. Rashbehari Ghosh, C.I.E., M.A., D.L. (Advocate).

Vice-President: Rai Naren Sen Bahadur (Journalist).

Treasurers: (1) Kumar Manmatha Mitra (Zamindar).
(2) Gaganendra Tagore (Zamindar and Artist).

Secretaries: (1) Dr. Nilratan Sarkar, M.A., M.D. (Medical Practitioner). (2) Satyananda Bose, M.A., B.L. (Advocate).

Assistant Secretary: Sainlen Mitra (Zamindar).

Members: (1) Tarak Palit (Barrister). (2) Rajen Mukerjee C.I.E. (Industrialist). (3) Pramatha Bose, B.Sc. (London), F.G.S. (London) (Geologist). (4) Deva Sarvadikari, M.A., B.L. (Attorney). (6) Basanta Bose, M.A., B.L. (Advocate). (6) Pramatha Sen, M.A., B.L. (Advocate). (7) Maulvi Syed Sham-

* This Section has to be read along with Sections 4 and 5.

sul Huda, M.A., B.L. (Advocate). (8) Prasanna Sen, L.C.E. (Civil Engineer). (9) Dr. Kali Bagchi, M.D. (Medical Practitioner). (10) Pran Acharya M.A., M.B. (Medical Practitioner). (11) Pravash Mitra, M.A., B.L. (Advocate). (12) Bonowari Chowdhury, B.A., B.Sc. (Zoologist).

Of the twenty persons listed above nine belonged to the legal profession, three to the medical, three were zamindars (landowners), two were men of science (geology and zoology), one a journalist, one a civil engineer and one a businessman (industrialist). The Bengal of those days was not evidently in a position to offer from among her élites anybody more techno-scientifically equipped than these men to take charge of an educational institution for technology. The governing body was therefore as non-scientific, non-*mistrified*, non-engineering and non-technocratic as conceivable. It is under such unfavourable conditions that technical education made its start. The pioneers of Jadavpur engineers and technologists were anything but engineers and technologists. But their enthusiasm for engineering, *mistrification* and technology was undoubted and profound. (See Part I. Chapter V. Administration).

Bengal Technical Institute had an Advisory Board of Experts. It was constituted as follows :

(1) P. B. Mukerjee, B.Sc. (London), M.R.A.S. (2) Dr. Jagadis Bose, C.I.E., M.A. (Cantab), D.Sc. (London) (Physicist). (3) Brajendra Seal, M.A. (Educationist and Professor of literature and philosophy). (4) Dr. Prafulla Roy, D.Sc. (Edin.) Ph.D. (Cal.) (Chemist). (5) E. Vredenburg, B.L., B.Sc. (Paris),, A.R.C.S. (Chemist). (6) P. J. Bruhl, M.I.E.E., F.G.S., F.C.S. (Botanist), (7) Chandra Bhaduri, B.A. (Chemist).

These experts had no administrative or teaching function at B.T.I. Two of these seven were non-Indian. The

rest belonged to the most distinguished among the scientists and educators of the country. But none was an engineer or technologist. Only two, Roy and Bhaduri, had some experience of industry and industrial organization in connection with the Bengal Chemical and Pharmaceutical Works Ltd. Both, however, were employees of the Government at Presidency College, Calcutta.

The non-industrial, non-technocratic, non-engineering and non-commercial beginnings of techno-industrial education in Bengal cannot be overemphasized. The twentieth century commenced for the Bengali people as a thoroughly primitive and medieval age, as an anachronism of the modern world. The techno-scientific backwardness and economico-cultural lag of India *vis-à-vis* the more advanced regions of Eur-America was to be measured, so far as educational institutions are concerned, virtually by the entire period since the beginnings of mechanism and industrial revolution.

It is in this administrative *milieu* that the teaching staff of B.T.I. had to function. For 1909-10 this staff comprised the following persons :

Hony. Rector : Pramatha Bose, B.Sc. (London), F.G.S. (geologist), with no teaching or administrative function.

Principal : Sarat Datta, M.A. (Cal.), *Diplom Ingenieur* (Berlin-Charlottenburg).

For 1906-08 the Principal (Hony.) was Pramatha Bose.

Superintendent : Susil Chakravarti, M.A.

Chemistry, General, Applied and Industrial-Professors :
(1) R. Coulon, E.P.C. (2) Prafulla Mitra, M.A.
(on leave).

Chemistry of Dyeing and Bleaching, and Tinctorial Chemistry-Professor : Gopal Sen, M.A., F.C.S. (Leeds, Manchester and Germany).

General Chemistry- Lecturers : (1) Dr. Jyotish Bose, B.A., L.M.S. (2) Jogesh Ghosh, M.A.

Analytical Chemistry-Professor : R. Coulon, E.P.C.

Chemistry-Demonstrator : Kristo Goswami.

Physics and Mathematics-Professors : (1) Susil Chakravarti, M.A. (2) Surendra Mallik, M.A.

Physics Laboratory Assistant : Abani Chatterjee.

English-Professor : Nibaran Roy, M.A.

Mechanical Engineering and Electrical Engineering-Professors : (1) Sarat Datta, M.A. (Cal.), *Dipl. Ing.* (Berlin). (2) Jatin Das-Gupta, B.Sc. (Glasgow), A.M.I.C.E. (London), A.M.I.Mech.E. (London).

Mechanical Engineering and Electrical Engineering-Assistants : Hriday Bose, L.M.E. (2) Ajit Ghosh, L.M.E.

Geology-Professor : Krishna Samaddar, B.A.

Zoology and Botany-Professor : Dr. Jyotish Bose, B.A., L.M.S.

Ceramics-Professor : Satya Deb (Tokyo).

Chemistry of Ceramics, Tanning, Oils and Fats, and Mineralogy-Professor : R. Coulon, E.P.C.

Drawing-Professor : Jatin Das-Gupta, B.Sc. (Glasgow).

,, Teachers : (1) Aswini Das-Gupta, (2) Ramani Paul.

Officers-in-charge of Workshops : (1) Hriday Bose, (2) Ajit Ghosh.

Of the twenty names only three are those of Bengalis who had engineering and technological training, and this they received in foreign countries. These three, in addition to Nagen Rakshit of Bengal National College, may then be regarded as the real pioneers of technical education in Bengal. They are Sarat Datta (mechanical engineer) of Berlin, Gopal Sen (chemist) of Leeds, and Jatin Das-Gupta (mechanical engineer) of Leeds. The only other expert was non-Indian; the French chemist, Coulon.

For June 1906-June 1908 the Society for the Promotion

of Technical Education published the monthly subscriptions for Bengal Technical Institute as follows :—H. H. the Maharaja of Cooch Behar : Rs. 250. H. H. the Maharaja of Mayurbhanj : Rs. 100. H. H. the Maharaja of Tipperah : Rs. 100. Maharaja Manindra Nandi of Cossimbazar : Rs. 500. Raja Promoda Roy of Dighapatia : Rs. 200. Tarak Palit (Barrister) : Rs. 1,500. Loken Palit, I.C.S. (Judge) : Rs. 300. Kumar Manmatha Mitra (Zamindar) : Rs. 158. Kumar Naren Mitra (Zamindar) : Rs. 158. Byomkesh Chakravarti (Barrister) : Rs. 100. Satyen Sinha (Barrister) : Rs. 100. Sailen Mitra (Zamindar) : Rs. 25. Brajen Mitra (Barrister) : Rs. 10. Joytish Mitra : Rs. 25. Total Rs. 3,551.

The annual subscriptions were the following :—Binod Mitra (Barrister) : Rs. 565. Charu Ghosh (Barrister) : Rs. 259. Hari Bose (Barrister) : Rs. 50. Satish Das (Barrister) : Rs. 400. Rajen Mukerjee (Industrialist) : Rs. 1,000. Total Rs. 2,265.

The same report indicated the following donors and donations : H. H. the Maharaja of Cooch Behar : Rs. 10,000. Maharaja of Cossimbazar : Rs. 10,000. Maharaja of Tikari : Rs. 5,000. Maharaja of Mymensingh : Rs. 3,000. Maharaja of Natore : Rs. 1,000. Raja of Dighapatia : Rs. 5,000. Dr. Rashbehari Ghosh (Advocate) : Rs. 10,000. Kumar Manmatha Mitra (Zamindar) : Rs. 5,000. Kumar Naren Mitra (Zamindar) : Rs. 5,000. Tarak Palit (Barrister) : Rs. 10,000. Loken Palit, I.C.S. (Judge) : Rs. 2,500. Byomkesh Chakravarti (Barrister) : Rs. 2,500. Rajen Mukerjee (Industrialist) : Rs. 2,000. Satyen Sinha (Barrister) : Rs. 5,000. Gagan Tagore, Samar Tagore and Abani Tagore : Rs. 5,000. Sailen Mitra (Zamindar) : Rs. 1,500. Joytish Mitra : Rs. 1,000. Krishna Gupta, I.C.S. : Rs. 500. Deep Narain Sinha, (Bhagalpur) : Rs. 2,000. Tilakdhari Lall : Rs. 2,000. Ashu Chowdhury (Barrister) : Rs. 500. Satish Das (Barrister) : Rs. 400. Satyen Tagore, I.C.S. (Retd.) : Rs. 250. R. K. Chotay Narayan Sinha : Rs. 2,000. Ali Imam

(Barrister) : Rs. 135. Anath Guha (Mymensingh) : Rs : 1,250. Balai Datta : Rs. 250. Bhabadev Chatterjee : Rs. 500. Akshoy Gupta : Rs. 100. Moti Misra : Rs. 50. Prafulla Mitra : Rs. 10. Provash Mitra (Advocate) : Rs. 1,000. Srimati Saroj Kumari Devi : Rs. 20. Dr. Kali Bagchi : Rs. 20. Rishibar Mukerjee (Judge) : Rs. 100. Brajen Mitra (Barrister) : Rs. 250. Jogini Chatterjee : Rs. 100. Messrs. Khirode Gopal Mukerjee & Co. : Rs. 200. Pramatha Roy-Chowdhury (Zamindar) : Rs. 100. Satis Mitra : Rs. 25. Mohanta Maharaj of Bodh Gaya : Rs. 500. A Friend : Rs. 50. Jnanendra Chowdhury (Zamindar of Sherpur, Mymensingh) : Rs. 15. Hari Bose : Rs. 250. Charu Ghosh (Barrister) : Rs. 250. Total Rs. 96,325.

All these gifts came into the possession of the N. C. E. along with the amalgamation of the S. P. T. E. with that body in May 1910. These items are included in the list of donors and donations shown in Appendix.

SECTION 7

The Ideologies of Bengal Technical Institute

(1906-08)

The educational and industrial ideas of the Society for the Promotion of Technical Education in Bengal are lucidly set forth in the Society's first (and perhaps only?) *Report* (July 1906—June 1908) published in 1908. The following paragraphs are reproduced from that publication :

“Our attention is first directed to the great industrial awakening that has of late taken place in the country. Everywhere the signs of this new industrial spirit have manifested themselves. Our eyes have been opened to the vast natural resources of the country lying practically undeveloped. The success of Europeans in the field of industrial enterprise

has also been an object-lesson to us and has stimulated our energies. * * *

Generally speaking, our country possesses no institution where higher technical instruction on modern lines is imparted. Students have to go abroad to get the requisite training. But only a limited number can avail of this opportunity. Technical institutions in the country are, therefore, an absolute necessity. To meet it in some measure, however inadequate, the Society for the Promotion of Technical Education in Bengal was organized, and the Bengal Technical Institute was founded in pursuance of this object. * * *

They took for their ideal of technical education the systems that prevail and have succeeded so well in Europe and America and it was thought advisable that so far as it lay in their power their system should be shaped on those models. The Society for the Promotion of Technical Education in Bengal was thus started on the 1st June 1906 and was formally registered under Act XXI of 1860. The main object of the Society is to impart scientific and technical education to the Indian people, calculated to further their industrial progress.

The condition of the middle classes was uppermost in the minds of the founders of the Society. Yet the primary branch of technical education which is concerned with producing skilled artisans amongst the lower classes was not entirely left out of account though high Collegiate education was considered beyond its means. It was found advisable to take immediately in hand the secondary branch of technical education and add to it an Intermediate Department for the benefit of those young men who leave schools early with merely the rudiments of learning and are without any means to earn a decent livelihood.

With these objects in view the Society established the Bengal Technical Institute on the 25th of July 1906. It

secured the services of some distinguished graduates of the Calcutta University and opened classes in Chemistry, Physics, Drawing, English and Mathematics. Two departments were opened, *viz.*, the Secondary and the Intermediate. In the former students who pass the University Matriculation examination or the 5th Standard Examination of the National Council of Education or who possess some equivalent qualifications are eligible for admission. In the latter a much lower standard is required for admission. A special examination was held to admit students in the opening year, but this has subsequently been dispensed with.

The object of the Secondary Department is to train Prospectors, Foremen, Industrial Chemists and Assistant Engineers who will be competent to take charge of factories. The Intermediate Department is intended to turn out skilled operatives, assistants to foremen, engine-drivers, fitters, and mechanical draftsmen. The Engineering course in the Secondary Department comprises the Mechanical and Electrical branches, and the Chemical course includes Ceramics, Dyeing, Soap-making, Tanning, and Technological Chemistry. Besides, there is a course of Geology. It is worthy of remark that these subjects have been chosen with due regard to the industrial requirements of the people and the special facilities which the country affords for the growth of industries in these lines.

In the Intermediate Department the idea is to give only practical training in Fitting, Mechanical and Electrical, Dyeing, Carpentry, Electro-plating, Lithography, Soap-making and Tanning with easy lessons in Physics, Chemistry, English and Mathematics. There has thus been slight departure from the original plan which was to give the students of the Intermediate Department theoretical training also in all important subjects, through the medium of the vernacular. This scheme did not work well and had to be

modified in favour of the present. The first year in the Secondary Department is entirely taken up with general training in English, Mathematics, Physics, Chemistry, Drawing and Workshop practice. This gives a good foundation to the students in their subsequent technical studies. At the beginning of the second year each student is required to choose a special subject. In the Mechanical and Electrical Engineering courses Higher Mathematics and Physics have to be studied along with practice in Machine-drawing and Pattern-making, and the training in the special subject extends continuously to the end of the fourth year. The students of Chemical and Geological courses mostly confine their studies to chemistry and the special subjects.

The period of training in the Intermediate and in the Secondary Department is 3 years except in the Engineering and Technological Chemistry course of the latter where the period of study extends to 4 years."

The techno-pedagogic *Gestalt* of Bengal Technical Institute during the first two years of its existence is clearly exhibited in the above extracts from the *Report* of the S. P. T. E. for 1906-08.

SECTION 8

The Tug of War between Bengal National College and Bengal Technical Institute (Nov. 1905 to May 1910)

From 16 November 1905 to 25 May 1910 the people of Bengal developed a regular *Kultur-Kampf* (Culture-war) in the educational world. One party had its centre in the National Council of Education (with Bengal National College and School), the other in the Society for the Promotion of Technical Education in Bengal (Bengal Technical Institute). The war was fought over the question of the proper attitudes

of the nation towards the Government's Department of Public Instruction and the Calcutta University. The National Council wanted to function as a University and a *Technische Hochschule* in combination, a Harvard University together with a Massachusetts Institute of Technology. Its aim was (1) to grow into a full-fledged, omnibus and poly-facultied University, capable eventually of replacing the Calcutta University in due course and (2) at the same time to promote *mistrification* or technocratization of all grades through schools and colleges. The Society had no such ambitions but wanted simply to function as a body for the imparting of industrial education such as had been ignored by the Calcutta University and the Department of Public Instruction. The Society believed that the Calcutta University was minding its own business well; so far as it went, and did not care to interfere in the fields in which it had been active for nearly half a century.

The National Council's orientations to the University and Department of Public Instruction were radical and revolutionary. The shortcomings of the University's and the Government's educational work were declared to be three-fold. First, it had been systematically over-literary, *i.e.*, it had neglected exact science and technology. In this charge against the University and the Department the position of the National Council agreed to a certain extent with that of the Society, but it really went much further than the latter. The National Council was not convinced that due attention had been paid by the Government and the University to the study of the modern sciences (physics, chemistry, geology, biology, medicine, public health etc.) in the schools and colleges. In the course of fifty years India had not been able to produce bands of scientific researchers. With one or two exceptions modern Indians had no address in the world of exact science. No encouragement had been forthcoming from the University

and the Department to promote researches and investigations by Indian scientists and to spread the knowledge of the natural and positive sciences among the people. The Society's complacency and moderation in regard to the Department's and the University's up-to-date accomplishments were therefore unthinkable to the National Council.

The National Council would of course initiate education in the applied sciences of all sorts. The utilization of the natural resources of the country would by all means be the most fundamental plank in its educational programme. Mechanical and electrical engineering, applied chemistry, metallurgy, mining and other branches of technical and industrial education would demand its utmost attention. But it would intensify and generalize also the cultivation of the theoretical aspects of all these physical, natural or positive sciences in a manner befitting the interests and requirements of the teeming millions. The divergence of views between the National Council and the Society was indeed profound. The N. C. E. could not afford to remain a mere institution for the promotion of *mistrification*, pure and simple. Liberal arts, culture, humanism etc. were also to be promoted. Besides, its scheme of *mistrification* was of a higher order and more scientific or theoretical than that of the Society.

In the second place, the National Council charged the Department of Public Instruction as well as the University with having neglected, overlooked or ignored the "national ideals". Adequate importance had not been attached to the study of India's languages, literatures, history, philosophies, fine arts, as well as economic and political achievements. The University had failed to promote research into the civilization of ancient and medieval as well as modern India. Last but not least, Bengali, the mother-tongue of the people, had not been made the medium of instruction in the primary, secondary, collegiate and University stages.

Thirdly, both the Department of Public Instruction and the University had been administered without reference to national opinion, national sentiments, and national will. This, of course, was a purely political position, a corollary to the *swarajist* ideas and ideals of the Bengali revolution of 1905. The National Council wanted education not only along "national lines" as defined above, but also "under national control". In regard to this political item there was at bottom hardly any antithesis between the National Council and the Society. But nuances or doses of repugnance to association with Government institutions made quite a great gulf between the individual members of the two parties. For all practical purposes, the Society (and Bengal Technical Institute) began to be described as "moderate", "loyalist", pro-Government and so forth while the National Council was taken to stand for "extremism", freedom, anti-Government, and what not. The dichotomy was perfect in the speculative sphere and bazar gossip.

This polarity of views conveniently boiled itself down into the antithesis : nationalism *vs.* materialism, and culture *vs.* crude *mistrification*. As the exponent exclusively of technical education the Society was condemned by certain sections as materialistic, unpatriotic, denationalized, anti-national or Western-minded. On the other hand, national glory, patriotic idealism, historic culture-sense, all-round nationalism, *mistrification* combined with science and culture, war against Western domination in culture and politics, all these virtues were attributed to those who worked for a literary, scientific as well as technical education such as might be a rival to and ultimately supplant the existing system administered by the Government Department and the officialized University. Much of this antithesis, dichotomy or polarism was indeed verbal. But the slogan, Bengal National College *vs.* Bengal Technical Institute, served to furnish the *raison d'être* of the

tug of war in the nationalist world of Bengal for over four years from November 1905 to May 1910.

In spite of its thorough-going bread-and-butter philosophy and pure materialism or crude *mistrification* Bengal Technical Institute failed to attract an adequate number of scholars for industrial education. Nor were the patriotism, national idealism, *swadeshi-swaraj* philosophy, and *mistrification-cum-culture* and science ideology of the Bengali revolution effective urges for Young Bengal to flock to Bengal National College for education, literary, scientific as well as technical. The *status quo* embodied in the Department of Public Instruction and the University was too powerful. The Bastille of mediævalism, anti-nationalism, non-scientific and non-technical literarism could not be subverted. And so the tug of war between the two wings of nationalists, moderate and extremist, came by degrees to a close. Each had found its own measure as well as that of the other.

The *Kultur-Kampf* was ended by the dissolution of the Society and the total merging of that body into the National Council (May 25, 1910). The merger or amalgamation was synthetic enough to include, among others, the following terms: "The Council shall establish and maintain a Central Educational Institution for imparting general and technical education in all its phases according to the scheme of studies approved by the Council. The arts and pure science side of the institution shall be called the Bengal National College and the applied science side of this Institution shall be called the Bengal Technical Institute. The internal management of the Bengal National College and the Bengal Technical Institute shall be vested in two separate Managing Committees." (*Annual Report for 1909-10*, p. 2).

With the cessation of hostilities the National Council scored a formal triumph over its rival, the Society, in regard to the question of ideals. But it was a glorious *harakiri* that

the Society committed. For in the course of a few years, be it said at once, Bengal National College found itself with empty benches and automatically ceased to exist. By 1916-17 not a student cared to come for literary and scientific instruction along national lines. The institution that endured and survived is the institution of alleged materialism, or bread-and-butter (*dal-bhat*) philosophy, Bengal Technical Institute. The Society for the Promotion of Technical Education was therefore justified by nemesis. In the interest of intellectual honesty this justification of the Society has need to be frankly admitted to-day by all those who, like the present author, were in the opposite camp, *i.e.*, exponents of N. C. E. ideology during the epoch of the Bengali revolution (1905-10).

Incidentally, be it observed, further, that during the last quarter of a century, thanks to the constructive patriotism, painstaking statesmanship and patient idealism of Ashutosh Mukerjee (c. 1914-25) Calcutta University has virtually grown into whatever the N. C. E. wanted to be between 1905 and 1910. Researches in modern sciences (from mathematics to zoology) as well as ancient, medieval and modern Indian (comprising Islamic) culture (language, literature, arts, philosophy, history, religion, economy, polity and social conditions) are today, humanly speaking, *i.e.*, within the limitations of funds, conspicuous features of the Post-Graduate Department. Even the Bengali medium of instruction is already in operation in the school stages. "National lines" are, therefore, in evidence in every sphere of the University's pedagogic activities. As for "national control", it is questionable if,—in spite of contacts with the Government of Bengal and the Department of Public Instruction,—any of the several hundred members of the teaching and administrative staffs can ever feel in their daily work the shadows of anything but national control.

In an atmosphere like this, Bengal National College, as

an institution independent of the University, can have no place and does not factually have any. But the teaching of mechanical, electrical and chemical engineering remains yet to be undertaken by the University. This is why the N. C. E.'s Jadavpur College of Engineering and Technology is supplying a real need.

SECTION 9

The Pedagogic Paraphernalia of the N. C. E. (1906-10)

The educational menu served by the National Council of Education during the period of this tug of war was not unsubstantial. The educational *Gestalt* was creative and diversified.

An American-schooled N. C. E. alumnus (1906-10), who joined Bengal National College on the opening day, is at present Director of Development and Industries in an Indian State after retiring from service with the Government of India. In the present occupation, says he, his engineering studies at B. N. C., although carried on long ago, are found very useful. "In its early years", he observes further, "the Council tried to adapt its activities to the requirements of the country, no matter whether the success was poor or not."

An Advocate (M.A., B.L.) of the High Court at Calcutta states that he was a student of the National Council from 1906 to 1913 having come up to the Proficiency Class in History and Political Science and that he later passed the Calcutta University examinations from Matric to Law (1913-20). He believes that the knowledge of elementary science that he obtained under the N. C. E. system has been helpful in his career. The visual and practical science on which Bengal National College laid stress is specially referred to by him as valuable. In regard to his present equipment in toxicological and medico-juristic aspects of the legal profession

the scientific knowledge acquired during those days is the foundation, says he. He is, besides, grateful to the National Council for the inspiration in nationalism which he derived in that atmosphere and which often helps him in his legal career as the defendant of worthy causes.

An alumnus of 1908-11, equipped with American and German experience, writes as follows: "The schooling I received under the N. C. E. has been useful to me in the way of making me serious-minded, painstaking and devoted in the matter of promoting the interests of the country in industrial fields." He maintains that "the library, the laboratories and the workshops were ill equipped for want of sufficient funds. However, the staff which contained some eminent professors was sincerely devoted to their duties and coached the student in every possible way. Their sincerity and devotion compensated the ill equipment of the N. C. E."

Speaking about the N. C. E.'s schooling during 1906-10 one of the oldest alumni and teachers remarks that "Satis Mukerjee's Dawn Society by its *Magazine* articles supplemented in a large measure the cultural education imparted by the N. C. E."

The observations of a Lecturer of the Calcutta University,—a foreign-trained N. C. E. alumnus run thus: "When I was a student in the N. C. E. (1906-10), it was just being organized and the schooling, therefore, fell far from expectations.. History, so far as I can recall, was taught the best in a most interesting way.. The teaching in the schools was according to the direct method, and it was fairly successful because of the comparatively small number of students which made intimate contact between the teachers and the students possible."

Another of the seniormost alumni, now on the teaching staff of Jadavpur College, recalls that although there were no big laboratories or adequate equipments during 1906-10, the

N. C. E. managed to impart instruction in a manner that elicited admiration from the cultured public. The handful of well-known prominent teachers "made up for the drawbacks and limitations in material resources."

According to another of the oldest N. C. E. alumni with American training, now a high official in one of the scientific departments of the Government of India he "had a basic education of a sort" from the schooling during 1906-09. "It was more of an idealistic nature", says he, "practical laboratory work was defective. Perhaps the teachers in science had hardly any contact with the work done by scientists of the world. I make these remarks from my own findings in the U. S. A., where I went almost about a year after my studies in the N. C. E."

A foreign (American and German) trained N. C. E. scholar, now a Professor at the College, is of the opinion that as student during 1908-10 he found the schooling neither regular nor very efficient. "But the teachers instilled idealism in me," says he, "and gave me wider outlook and liberal culture. In those days the shortcomings were many. There was want of equipments and in certain subjects want of really good teachers." But these were more than made up by the fact that, as he observes, "we were taught to think for ourselves and to be more self-reliant."

About one of the senior alumni of the N. C. E. there has recently been a melancholy occasion for the present author to write. The premature death of Naren Sen-Gupta (1944) is the occasion referred to. On invitation from the Editor, Dr. Suhrit Mitra, M.A., D. Phil. (Leipzig) a paper entitled "The Making of Naren Sen-Gupta, the Pioneer of Experimental Psychology in India" was written for the *Indian Journal of Psychology* (Calcutta).¹ The following rather lengthy extract from that article published in Vol. XIX (1944, Parts III

1 Part of the information about Sen-Gupta is derived from his elder

and IV) is being presented here as it throws some light on the academic ecology and pedagogic paraphernalia of the National Council of Education during the first few years of its existence,—especially in regard to the humanistic or cultural side. Be it recalled that this was the period of tug of war between Bengal National College and Bengal Technical Institute. The atmosphere was critical and pluralistic.

• The National Council of Education played a substantial part in the making of Narendra Nath Sen-Gupta, the pioneer of experimental psychology in India. We have, of course, to look for diverse forces and tendencies such as are common in the early career of virtually every young Bengali of the intellectual middle class.

Son of a lawyer, Tarini Charan Sen-Gupta, Naren was born in a family of Vaidyas at Tentulia in Faridpur (East Bengal) on December 23, 1889. His first schooling was done, however, in North Bengal at Rangpur where as a student of the Government Zilla School he had among comrades Nalini Gupta (man of letters, at present associated with the Aurobindo Circle at Pondichery) and Mohini Bhattacharya (of the English Literature Department of the Calcutta University). He was at the same time taking a special course in Sanskrit at the *Tol* (Oriental Institute) maintained by Mahamahopadhyaya Pandit Jadaveswar Tarkaratna. It was at Rangpur, when a boy of

brother, Dr. Suren Sen (Calcutta), Income-tax Officer Jatin Set, and Professors Hiralal Roy, Mohini Bhattacharya, Gopeswar Pal, Priya Sen, Suren Goswami, and Saroj Das.

Some of Sen-Gupta's work may be seen in "The Field of Race Psychology" (*Indian Journal of Psychology*, Vol. III. 1927, No. 2.), "The Mind in its New Setting" (Presidential Address at the Indian Philosophical Congress, Madras, 1940), "Inheritance and Criminal Behaviour" (*Penal Reformer*, Lucknow, January 1941), and *Heredity in Mental Traits* (London 1941). See also references to Sen-Gupta in Radha Kamal Mukerjee: *Theory and Art of Mysticism* (London 1937) as well as Mukerjee and Sen-Gupta: *Introduction to Social Psychology*, (Boston 1928).

thirteen or fourteen, that the first public lecture was heard by him. This was by Satyen Tagore, I.C.S., who in the midst of his address to students recited his brother Rabi Tagore's *Bandi Vir* (The Hero in Chains).

The extra-interest in Sanskrit language exhibited by Sen-Gupta in childhood is noteworthy. It persisted throughout his life and did not fail to influence him in his publications relating to experimental psychology. The paper on *Mind in its New Setting* (Madras 1940), an essentially modernist study, gives evidence of his indebtedness to old India's contributions.

1905 was the year of the glorious Bengali revolution. It declared itself, among other things, in the boycott of British goods as well as in the boycott of Government schools. The movement stirred the enthusiasm of the boy, Sen-Gupta, and he was seen with his chums in the market places and villages of Rangpur addressing the bazar people and the rustics against the use of foreign articles. The inspiration for such public activities was intensified in a special manner because of the oratories of Sachin Bose, a youth-leader of those days, and Rama Kanta Roy, Japanese-educated mining engineer, who had come from Calcutta to carry on propaganda in Rangpur. (See pp. 43-49, 71-72).

It so happened that the first Government school to be boycotted was the one at Rangpur. And so at the age of 15 Sen-Gupta, while still in the pre-Matric class joined the boycott movement and became the nucleus of the first "national school" established in Bengal. It was in order to take charge of such schools in diverse districts that the National Council of Education was organized at Calcutta by Satis Mukerjee of the Dawn Society, Ex-Judge Gooroodass Banerjee, Advocate Rashbehari Ghosh, Attorney Hiren Datta and others. Sen-Gupta's teachers at the National School were Prabhat Mukerjee (story-writer of the Maupassant type), Braja Sundar Roy, Nripen Banerjee, Prabhas De and Ambika Bhattacharyya,

all brilliant and patriotic intellectuals who have later been prominent in academic life. To this staff belonged also Atul Gupta, who is well-known today as a lawyer of distinction at the Calcutta High Court and a keen critic of arts and letters.

The next rung of the academic ladder finds Sen-Gupta at Calcutta in 1907. He joined the Bengal National College, then under the direct supervision of Satis Mukerjee. For the two preliminary College years (Sixth and Seventh Standards) he had Pali with Bhikkhu Punnananda, Marathi with Sakharam Ganesh Deuskar, already famous as the author of the epochmaking *Desher Katha* (Facts about the Motherland), Hindi with Baburao Paradkar (Journalist), Sanskrit with Pandits Mokshada Samadhyayi and Durga Sankhya-Vedanta-tirtha, Indian History with Radha Kumud Mukerjee, Logic with Pramatha Mukerjee (Swami Pratyagatmananda), and last but not least, English Literature with Aurobindo Ghosh, who was then Principal of the College as well as a colleague of Bipin Pal on the editorial staff of the daily *Bande Mataram*.

Sen-Gupta was living in a students' mess of Bengal National College. To the group of his mess-comrades belonged Haren Paul (Bank Manager), Durga Bhattacharya (Geologist), Hiralal Roy and Baneswar Dass (of the Chemistry Department at the College of Engineering and Technology, Jadavpur), as well as Durga Ghoshal (associated with the daily *Basumatî*). In those days as today students' messes were intensely creative. It was in the *tête-à-têtes* and altercations furnished by that *milieu* that Sen-Gupta along with others assimilated the most varied *vishwa-shakti* (world-forces). The stir and turmoil of life was enriched in no small doses by the Police house-searches conducted in the mess in connection with the political movements of Young Bengal.

The imagination of students and youngmen was then fired by the activities of the *Anushilan Samiti* (Culture Society), the *Atmonnati Samiti* (Self-Improvement Society) and other

associations for physical culture, athletics, *lathi* (rod) and sword play, and so forth. Pulin Das of Dacca was an all-Bengal celebrity as a General of this Bengali "Sokol" movement. Some of these organizations were used to the doctrine of solemn oath and unconditional obedience to the leader. It was, not, therefore, possible for Sen-Gupta and others, individualists as they were, to associate themselves with such organizations.

These two years were momentous in the intellectual and moral atmosphere of Calcutta as of All-Bengal. In June 1907 was published Aurobindo's "India for Indians" in the *Bande Mataram*. This led to his arrest which was the occasion for his inspiring message to B. N. C. students, namely, "Work that she (Motherland) may prosper, Suffer that she may rejoice" (August, 22). The ideologies of the passive resistance movement were being formulated by Bipin Pal. The second volume of the *History of Hindu Chemistry* by Prafulla Roy, founder of the Bengal Chemical and Pharmaceutical Works, (with Appendices and Introduction by Brajen Seal), President of the N. C. E. (1924-44), was published about this time. This proved to be a veritable spiritual force among the *intelligentsia* as a document of old Indian materialism and positivism. It was the epoch of the first Bengali banks, insurance companies, match factories and other industrial enterprises. The cult of Bankim Chatterjee, author of *Bande Mataram* (national anthem), was in the air and took shape in the first public celebrations at his village, Kanthalpara, about 25 miles off Calcutta to the north.

The theatre was commanded by the soul-stirring dramas of Kshirod Vidyavinod (a professor of B. N. C.) and Dwijen Roy. The *Bangiya Sahitya Parishat* (Academy of Bengali Literature) was acquiring fresh life under the inspiration of Ramendra Trivedi, the essayist on scientific and social problems. Tagore's *Gora* made its appearance in *Prabasi* articles (1908). To Young Bengal Tagore was at that time the

poet *par excellence* of the fire-eating "Ode to Aurobindo" composed on the occasion of the latter's first arrest (August, 1907). Such were some of the ingredients in the menu of daily *dal-bhat* on which Sen-Gupta and his comrades were nurtured in and out of school during 1907-09.

During 1909-10 Sen-Gupta was in the First-Year Proficiency Class of History. His principal teachers were Radha Kumud Mukerjee, Rabi Ghosh and Haran Chakladar for Indian Archaeology and Antiquities, Dhammananda Kosambi for Pali and Buddhist Culture, Pandits Chandra Nyayalankar and Kedar Sankhya-Tarkatirtha for Sanskrit, and the present writer for Modern European History and Constitutions.² Two of his Lucknow colleagues of later years were Sen-Gupta's mess-mates of this period, namely, Radha Kamal Mukerjee (sociologist) and Satyen Mukerjee (auditor and accountant).

The academic atmosphere of the National Council of Education was mainly industrial, technical and scientific. But it was enlivened by the impact of researches in Ancient Indian History and Culture. Sen-Gupta found that Smith's *Early History of India* and Davids's *Buddhist India*,—rather recent publications in those days,—were appreciated as the Bibles of historical nationalism and that Dines Sen's *History of Bengali Language and Literature* occupied the same rank in the estimation of culture-historical enthusiasts. During this period Kautalya's *Arthashastra* was a new star on the academic horizon as an expression of India's will to power and economico-political energism. The beginnings of Kautalyology on the one hand and of scholarship relating to "Greater India" on the other were encountered by Sen-Gupta in the investigations inspired by and conducted under the guidance of Satis Mukerjee. *The Dawn and the Dawn Society's Magazine* was

² Part of the lectures delivered to these classes (1907-11) is embodied in B. K. Sarkar: *The Science of History and the Hope of Mankind* (London 1912).

Mukerjee's monthly organ of publications bearing on India, past and present. The folk-songs, folk-dances and folk-arts of the people of Malda associated with the spring socio-religious festivities known as *Gambhira* were touched by Sen-Gupta as the theme of studies by Hari Palit of the District Council of National Education, Malda which was affiliated to the National Council of Education, Bengal (Calcutta).³ Social anthropology was getting popular among philologists and socio-religious antiquarians as economics, engineering and pedagogics among modernists. The culture-pattern was rich.

By cultural sympathies and research activities Kashi Jayaswal, then Barrister at Calcutta, belonged to the National College group. The professors and students were in intimate touch with Jayaswal's ideas about the constitutional and political achievements of the ancient Hindus. They were formally introduced likewise to the spiritualitarian art-ideologies of Havell, Coomaraswamy and Abani Tagore through extension lectures. Sen-Gupta's intellectual household was thus in a position not only to welcome Kautalya's *Realpolitik* but to absorb both the materialistic and idealistic strands in indological interpretation.

The indological interest of Sen-Gupta was testified to by Radha Kumud Mukerjee in the preface to his *History of Indian Shipping* (London, 1912). He won the appreciation of his mess-mates because the complete works of Tagore (in Mohit Sen's edition) were his constant companions. He was admired likewise as being able to reproduce not only Kalidasa's *Meghaduta* in Sanskrit but the *Vaishnava-Padavali* (in Bengali) of Vidyapati as well. His sympathy with the mystical or the ecstatic as much as with the positive and the secular was patent to his comrades. Pluralism was obvious.

³ Hari Palit: *Adyer Gambhira* (Calcutta, 1912), B. K. Sarkar: *The Folk-Element in Hindu Culture* (London 1917).

Normally, it would have taken Sen-Gupta another three years to finish the Proficiency Course in History. But in August, 1910 he was furnished with a travelling fellowship for proceeding to the U. S. A. for higher studies.⁴ It is with the object of equipping Bengal National College with American-educated Professors that a fund was established by the present writer in co-operation with Radha Kumud Mukerjee. Six other senior students associated with the national education movement in Malda and at Calcutta were also selected by him for the journey abroad. The respective subjects of study as well as the Universities were likewise fixed up by him. In this manner both experimental psychology and Harvard University suddenly thrust themselves upon Sen-Gupta's attention and interest. His academic career up till then was anything but specifically philosophical, scientific or psychological. Nor was experimental psychology known in India in those days more than as the conventional "psychophysics" of one or two high-brows. And Harvard as a University was virtually a *terra incognita* of the Indian academic universe. The "pioneering" of Experimental Psychology in India owes, therefore, a great deal to sheer accident.

The fellowship was granted to Sen-Gupta and others on the condition formalized by a legal contract to the effect that on return from the U. S. A. each one would serve the National Council on a mere subsistence allowance. The model was furnished somewhat by the terms of service which regulated in those days the career of Raghunath Paranjpye and other Professors of Fergusson College, Poona.

Fellow-passengers with Sen-Gupta on board the steamer from Calcutta were his six comrades of the National College.

⁴ See the Reports of the National Council of Education, Bengal, for 1910-14.

Three of them were to be Harvard men, namely, Jatin Set (Physics), Hiralal Roy (Chemistry) and Bejoy Sarkar (Economics). The remaining three were destined for other Universities, Suren Bal for Pharmacy and Hem Das-Gupta for Mechanical Engineering at Michigan, and Dhiren Sarkar for Applied Chemistry at Yale. He made the acquaintance of two other scholars, both chemists, who left by the same boat to join the University of Berlin. They were Dhiren Chakravarti and Abinash Bhattacharya (an N. C. E. alumnus), well-known today in the scientific and industrial sphere of Calcutta.

CHAPTER II

*Bengal Technical Institute as Run by the
National Council of Education
(1911-19)*

SECTION 1

Teachers of Technology Old and New

During 1910-11, the first full year of the Bengal Technical Institute, as administered by the National Council of Education, the teaching staff was constituted as follows : (1) Professor Sushil Chakravarti, M. A., (Physics), (2) Prof. Jagadindu Roy (Physics). (3) Rashbehari Bose, M.A., (Demonstrator in Physics). (4) Aswini Paul (Teacher of Elementary Physics). (5) Ram Lahiri (Assistant, Physical Laboratory). (6) Prof. R. Coulon, E.P.E. (Industrial Chemistry). (7) Prof. Moni Banerjee, F.C.S. (General Chemistry). (8) Krishna Goswami (Demonstrator in Chemistry). (9) Kunja Sen-Gupta (First Asst. Chemical Laboratory). (10) Digin Sen-Gupta (Second Asst. Chemical Laboratory). (11) Hari Bose (Asst. in Glassblowing). (12) Prof. Rakhal Palit, M.A. (Geology). (13) Prof. Gopal Sen, M.A. (Leeds,

Manchester and Germany) (Dyeing). (14) Prof. Purna Ganguli, B.Sc. (Glasgow) (Mechanical Engineering). (15) Prof. Bhim Chatterjee, B.A., B.Sc. (Allahabad and Roorkee) (Surveying and Electrical Engineering). (16) Aswini Gupta (Teacher of Drawing). (17) Ramani Paul (Teacher of Drawing and Mechanics). (18) Kshitish Mukerjee (Teacher of Drawing and Mechanics). (19) Woopen Das (Foreman Instructor).

The Dyeing Department was in charge of Professor Gopal Sen during 1911. It was run for three to five students as follows :

Class		1910	1911
First year	...	0	2
Second Year	...	2	1
Third Year	...	1	2
Total	...	3	5

Professors Purna Ganguli and Bhim Chatterjee were at that time in charge of the Engineering Department. It was constituted, in student strength, as follows :

Secondary Department			
Class		1910	1911
Preparatory	...	0	13
First Year	...	18	8
Second Year	...	14	9
Third Year	...	7	9
Total	...	39	39

Primary Department			
Class		1910	1911
First Year	...	22	19
Second Year	...	21	15
Third Year	...	7	15
Total	...	50	49

In 1910 there were 39 students in the Secondary and 50 in the Primary Classes. The next year they were 39 and 49 respectively.

The Physics Department was in charge of Professors Sushil Chakravarti and Jagadindu Roy. The students were grouped as follows in 1911 :

General Section

Proficiency Class :	...	...	...	8
Fifth, Sixth and Seventh Standard (Secondary)				13
School Classes from 1st to 4th Year		...		62
Total	...	...	...	83

Technical Section

Secondary Classes	...	...	...	34
Primary	„	...	...	39
Total	...	...	...	73

The number of students working in the Physical Laboratory was, then, 156.

Chemistry was studied by the students of Dyeing, Geology, Chemistry, Proficiency, Mechanical Engineering, Electrical Engineering as well as the school departments. The number of students working in the Chemical Laboratory was as follows :

Technical Section	...	...	24
College Classes	...	...	8
School Department	...	...	109
Casual Students	...	...	6
TOTAL	...	147	

In charge of the Chemical Department were Professors Moni Banerjee and Coulon.

For geology there were 5 students in 1910 and 6 in 1911 in the three classes put together. The Professor was Rakhal Palit.

It was found expedient to suspend the Geology and Dyeing Departments in 1912.

Professors Coulon and Gopal Sen left B.T.I. in 1912, Professors Sushil Chakravarti and Moni Banerjee in 1913, Professor Bhim Chatterjee in 1916 and Professor Purna Ganguli in 1923. This is the story of the first batch of pioneers among Young Bengal's teachers of technology. They are the predecessors of the present teaching staff of Jadavpur College. Some of the present teachers were their pupils as well as colleagues for some time.

In 1913 both Jatin Set, A.B. (Harvard) and Hiralal Roy, A.B. (Harvard) joined the staff, one as professor of physics and the other as professor of chemistry. They found Purna Ganguli, Jagadindu Roy and Bhim Chatterjee functioning for several years.

By 1918 Hem Das-Gupta, B.M.E. (Michigan) was also a colleague of the old and the new. In 1921 he was one of the two Hony. Secretaries of the Managing Committee of B.T.I., the other being Advocate Satya Bose, M.A., B.L. Professor Hem Das-Gupta was in charge of the Mechanical Engineering Department for twenty years down to his resignation in 1939.

SECTION 2

The Pattern of Finance and Administration

The sheet anchor of the finance for education in engineering was the old pioneering endowments for the N.C.E. made by three self-sacrificing landholders, namely, Brajen

Roy-Chowdhury, Maharaja Mymensingh, and Subodh Mallik. This triumvirate has remained immortal in the annals of Bengali patriotism and national idealism.

Some of the larger annual donations for 1911 were as follows :

(1) Barrister Tarak Palit : Rs. 24,000. (2) Maharaja Manindra Nandi : Rs. 8,000. (3) Maharaja Cooch Behar : Rs. 3,000. (4) Barrister Ashu Chowdhury : Rs. 3,000. (5) Barrister Byomkesh Chakravarti : Rs. 3,000. (6) Kumar Manmatha Mitra (Zamindar) : Rs. 1,900. (7) Kumar Naren Mitra (Zamindar) : Rs. 1,900. (8) Advocate Dr. Rashbehari Ghosh : Rs. 1,620. (9) Maharaja Tipperah : Rs. 1,200. (10) Maharaja Mayurbhanj : Rs. 1,200. (11) Yatin Roy Chowdhury (Zamindar) : Rs. 1,200. (12) Barrister Satyen Sinha : Rs. 1,200. (13) Rajen Mukerjee (Industrialist) : Rs. 1,000. (14) Gooroodass Banerjee (*Ex-Judge*) : Rs. 600. (15) Dhannulal Agarwala (Merchant) : Rs. 300. (16) Sailen Mitra (Zamindar) : Rs. 300. (17) Barrister Jnan Roy : Rs. 200. (18) Barrister Abdul Rasul : Rs. 100. (19) Dr. Suresh Sarvadikari (Surgeon) : Rs. 100. (20) Munshi Kalimuddin : Rs. 100. (21) Baikuntha Sen (Advocate) : Rs. 100.

The above statement does not seek to furnish an exhaustive account of the entire financial position of the National Council. It gives an idea of the amount of help that used to come from donors and the kind of persons that used to take interest in education for industrialization, "*mistrification*" (training of *mistris* or technicians and engineers) and the like.

Details about the teaching staff and the progress of Bengal Technical Institute during World-War I (1914-18) are not plentiful. The *Annual Report* for 1918 was the last Report published during the second decade of the century, the next Report to be published being that for 1921.

It is possible to get the names of the members of the

Managing Committee for Bengal Technical Institute during 1918. They are as follows :

- (1) Sir Gooroodass Banerjee, M.A., D.L., Ph.D. (Ex-Judge and Educationist).
- (2) Nagen Rakshit (Industrialist).
- (3) Brajen Roy-Chowdhury (Zamindar).
- (4) Manomohan Bhattacharya, M.A., (Sanskritist)
- (5) Gagan Biswas, L.C.E. (Civil Engineer).
- (7) Abinash Chatterjee, B.A., B.E. (Civil Engineer).
- (8) Hiren Datta, M.A., B.L. (Attorney).
- (9) Charu Mitra, M.A., B.L. (Advocate).
- (10) Prof. Jagadindu Roy (Physics).
- (11) Kumar Datta, B.L. (Advocate).
- (12) Professor Hiralal Roy, A.B. (Harvard) (Chemistry).
- (13) Dr. Deben Mallik, B.A. (Cantab), D.Sc. (Dublin), F.R.S.E. (Mathematics).
- (14) Prof. Kali Das-Gupta, M.A. (History).
- (15) Prof. Hem Das-Gupta, B.M.E. (Michigan) (Mechanical Engineering).
- (16) Prof. Purna Ganguli, B.Sc. (Glasgow) (Mechanical Engineering).
- (17) Satya Bose, M.A., B.L. (Advocate).

Of these 17 men 9 were non-industrial, non-engineering, non-scientific and non-business people. Eight were men of science, engineering, or industry. This was nearly 50 per cent. It must be observed, therefore, that the position in 1918 was much superior to that during 1906-08. Nay, even in 1911, the year after the amalgamation, the Managing Committee of Bengal Technical Institute had 13 non-industrial, non-technical and non-scientific men out of 21. Of the remaining eight, again, four were medical practitioners. That is, not more than 20 per cent was techno-scientifically minded. The progress during ten or twelve years was undoubtedly.

(See pp. 27—31, 76—80, 86—88).

The annual expenses on the two Colleges maintained by the National Council of Education from 1911 to 1918 are described in the following table (in round figures) :

Year	Bengal Technical	General	Total
	Institute	Department	
	Rs.	Rs.	Rs.
1911	... 63,000	33,000	96,000
1912	... 43,000	26,000	69,000
1913	... 27,000	19,000	46,000
1914	... 27,000	29,000	56,000
1915	... 25,000	23,000	48,000
1916	... .....	.....	.....
1917	... .....	.....	.....
1918	... 31,000	17,000	48,000
Total	... 216,000	147,000	363,000

In eight years Bengal Technical Institute accounted for Rs. 216,000 and the General Department for Rs. 147,000. The annual average for B.T.I. was Rs. 27,000 and that for the other nearly Rs. 18,000. In the perspective of such accounts those for Jadavpur College in recent years would appear extraordinary. (See pp. 31-33).

Indeed, the very next published Report, *i.e.* the one for 1921 shows the expenses for B.T.I. as nearly Rs. 76,000 and for the other as Rs. 12,000, the total being Rs. 88,000. The rising tempo was maintained in 1922 when the same items were over Rs. 82,000 and Rs. 17,000 (total over Rs. 99,000). In all these instances the total does not imply the factual total of *all* the disbursements of the N.C.E. It describes nothing but the two principal items. Be it recalled that Bengal National College ceased to function by 1916-17. (See p. 99).

In order to grasp the difference between the two epochs, as it were, of the Bengal Technical Institute finance let us here bring together the expenses for the quinquennium 1921-25. They are given in the following table in round figures :

Year	B.T.I.	General Dept	Total
1921	76,000	12,000	88,000
1922	82,000	17,000	99,000
1923	79,000	19,000	98,000
1924	136,000	23,000	159,000
1925	137,000	23,000	160,000
	510,000	94,000	604,000

During the quinquennium 1921-25 the total expenses on B.T.I. amounted to Rs. 510,000, and on the General Department to Rs. 94,000. The total came up to Rs. 604,000. The annual average on B.T.I. was then nearly Rs. 102,000, on the General Department nearly Rs. 19,000 and on the total Rs. 121,000. We have the annual average of Rs. 102,000 during 1921-25 as against that of Rs. 27,000 during 1911-18.

Evidently, post-1921 B.T.I. was experiencing, as it were, a *renaissance*. The primitiveness of pre-1921 conditions in regard to educational facilities for industrialization and economic modernization is obvious. Equally obvious is the progress about 1921 from the still more primitive conditions of 1906. The pioneering activities of the fathers of the national education movement from 1906 to 1920 have to be appraised as specimens of self-sacrifice, creative patriotism and strenuous exertions.

SECTION 3

Self-Sacrifice and Martyrdom

In 1914 the monthly wages or salaries of persons connected with the National Council in teaching and other capacities were as follows :

1. Professor of Eastern Philosophy : Rs. 50. 2. Professor of Western Philosophy : Rs. 75. 3. Professor of Mathematics : Rs. 75. 4. Professor of History : Rs. 100.

5. Professor of English : Rs. 100. 6. Professor of Physics : Rs. 100. 7. Professor of Chemistry : Rs. 100. 8. Professor of Engineering and Survey : Rs. 150. 9. Hem Basu-Mallik Professor of Indian History : Rs. 150. 10. Professor of Engineering : Rs. 250. 11. Teacher of History and Geography : Rs. 80. 12. Teacher of English : Rs. 80. 13. Teacher of Mathematics : Rs. 65. 14. Foreman Instructor : Rs. 60. 15. Demonstrator in Chemistry : Rs. 40. 16. Teacher of Sanskrit : Rs. 30. 17. Head *Mistri* (Technician), Mechanical Department : Rs. 30. 18. Head *Mistri* Electrical Department : Rs. 30. 19. Turner : Rs. 30. 20. Blacksmith : Rs. 30. 21. Carpenter : Rs. 30. 22. Bookbinder : Rs. 13. 23. Bearer : Rs. 9.

The above statement opens up, in the first place, the very low standard of living to which the Indian people was used in those days. Today also the standard remains more or less the same. That it was possible for an unskilled manual working-man (bearer) to live on Rs. 9 per month and for a skilled worker (*mistri*, turner, or carpenter) on Rs. 30 per month was but an index to the universally prevalent plain living of the people which has continued until the present time. There has been hardly any change during the last three decades, so far as the people's purchasing power or command over the necessities and comforts of life is concerned.

And yet it is questionable if the skill, intelligence, devotion to duty and working capacity of the people were as low as the wage or salary rates would lead one,—especially an Eur-American observer,—to suspect. The thirty-Rupee (10-dollar) turner of Bengal was certainly not one-tenth as creative, as "efficient", as dependable as, say, the 100-dollar workingman of New York or Chicago. Without the backing of machines, instruments and high-class tools as well as without the support of well-developed business organization the American industrial worker earning, say, ten times the wages per month could

not produce ten times the output of the Bengali workingman earning one-tenth the income.

Be this as it may, the socio-economic *milieu* in which Bengal Technical Institute was functioning on the eve of World-War I (1914-18) ought never to be lost sight of in any study of comparative pedagogics or comparative industrialism. Another item in this pattern deserves careful attention. Professors of physics, chemistry, history, philosophy, and English used to get between Rs. 50 and Rs. 100 per month. The highest salary was Rs. 250 per month. To a certain extent, again, we are made conscious of the low standard of living prevailing among the intellectual middle-classes of the country. But more striking is the self-sacrifice and economic martyrdom which some of the members of the *intelligentsia* were prepared to undergo in the interest of an educational transformation and techno-scientific remaking.

This self-denying ordinance passed by patriots on themselves was but organically connected with the thousand and one daily acts of heroism, painstaking endeavour, and silent dying by inches which characterized the numerous fathers of the Bengali revolution. The self-sacrifice to which Indian patriots are used is unparalleled in the world's annals of patriotism, self-sacrifice and martyrdom.

CHAPTER III

The Jadavpur Engineers and Technologists (1910-19)

SECTION 1

*The Jadavpurians of the First Decade**

The National Council of Education as well as the Bengal Technical Institute started work in 1906. The first scholars in

* Every Jadavpurian referred to in this Section is to be taken as belonging to the classes 1910-19. It is to be understood that class 1910 implies the class of those who passed out in 1910.

engineering and technology could not be turned out before 1910. The period 1910-19 then will have to be treated as the decade of beginnings. The second half of this period saw World-War I (1914-18) with its repercussions on industry, technique, engineering and allied education. About 1943 it was possible to obtain the business addresses of 73 alumni of the N. C. E. who had done their academic work during 1910-19, *i.e.* belonged to the classes 1910, 1911 and so forth down to 1919.

It should be noted at the outset that Bengal Technical Institute was taken over by the N. C. E. in 1910. Besides, the N. C. E. changed its local habitation several times. It was not before 1924 that the present location was fixed up, namely, the one at Jadavpur near Calcutta, and not before 1929 that the present name, "College of Engineering and Technology", was adopted. For the purposes of this study the Collegians of the N. C. E. and B. T. I. (down to 1910) are, however, being often described as Jadavpur engineers and technologists or simply Jadavpurians for the entire period since 1906. This description should not be misunderstood. (See pp. 34-35).

1. *Founders-Managers-Proprietors.* Of the N. C. E. scholars who had graduated during 1910-19 seventeen addresses were available about 1943 as those of persons employed in industrial and commercial concerns in the capacity of founders, proprietors or managing directors. The manufacturing line was represented by the Technological Laboratory and Works (Konnagar) and the Engineers Syndicate, Bangiya Diasalai Karyalaya (Match Factory), Calcutta Plating and Engineering Co., Bando & Co. (Engineers) as well as the Chemical Co. of Calcutta. The Punjab Metal Works were located at Amritsar. As engineers-contractors, or builders-contractors, five were established in Calcutta, one at Kalimpong (Darjeeling) and one at Baidyanathdham (Bihar). An export-import firm was established at New York. The Indo-Europa

Trading Company of Calcutta had been importing machineries from Germany, Switzerland and England as well as doing installations and repairs work in different parts of India.

2. *Tata Iron and Steel Co.* Fourteen Jadavpurians obtained employment with the Tata Iron and Steel Co. (Tisco) at Jamshedpur. Three were engineers, five chemists. Foremen were taken for the Coke Ovens and Electric Steel Melting Shop. A place was likewise found in the physical research department for a Jadavpur scholar.

3. *Machine Construction and Allied Works.* The Indian Iron and Steel Co. (Burnpur) took a Jadavpur scholar as electrical engineer. The Gun Factory at Ichapur near Calcutta employed one as assistant engineer. In the Sales Department of Balmer Lawrie & Co. (Calcutta) also one found employment.

4. *Electrical Enterprises.* The Electric Supply Co. of Lahore (Punjab) gave employment to two engineers from Jadavpur. The chief electrical engineer of the municipality at Raipur (C.P.) was selected from among the Jadavpur scholars. A chemist obtained a job with the Bengal Electric Lamp Works at Jadavpur.

5. *Chemical Concerns.* One Jadavpurian found employment as chemist with the Bengal Chemical and Pharmaceutical Works (Calcutta). Another was employed as engineer by the Russa Distillery at Tollygunge (Calcutta). The Oil Mills at Nalchiti (Barisal) likewise appointed a Jadavpur scholar as engineer.

6. *Railways.* Four N. C. E. scholars got employment with the railways. One was appointed as loco foreman by the Port Trust of Calcutta and one as electrical chargeman by the A. B. Ry. at Badarpur (Assam). An N. C. E. scholar became the chief chemist of the G. I. P. Ry. at Parel (Bombay) while another became an employee of the East African Railway as loco foreman.

7. *Cement Works.* An N. C. E. scholar was appointed by the Katni Cement Factory as manager.

8. *Petrol.* An N. C. E. scholar found employment with the Assam Oil Company at Digboi.

9. *Tea Estates.* Two N. C. E. scholars became managers of two tea estates in Jalpaiguri, the Saudamini and the Ambari.

10. *Calcutta Telephone.* Two scholars found employment with the Telephone Company, one as exchange engineer and the other as inspector.

11. *Calcutta Port Trust.* One N. C. E. scholar was employed as assistant engineer by the Port Trust of Calcutta.

12. *Teaching and Research.* Twelve N. C. E. scholars took to teaching as a profession. Seven were absorbed by the College of Engineering and Technology (Jadavpur). The Universities of Calcutta and Lucknow gave employment to one each. One was employed at Contai College (Midnapur) while one joined the teaching and research staff of the School of Tropical Medicine (Calcutta).

13. *Government Service.* Six N. C. E. scholars were officials of the Government's public administration in technical branches. The Geological Survey of India took three. The Botanical Department of the Indian Museum (Calcutta) had one, the curator. One was an Income Tax Officer at Calcutta and another the engineer of the Public Works Department at Madras.

14. *Miscellaneous.* One of the N. C. E. scholars was employed as a reporter of the *Statesman* (Calcutta).

Be it observed that among the 73 described above 18 or nearly 25 per cent had the chance of subsequently travelling in Eur-America and studying in the Universities and Technological Institutes of Germany, England and the U. S. A., as well as getting "factorified" in those countries.

SECTION 2

*The Socio-Economic Significance of the
N. C. E. Scholars*

The geographical distribution of the N. C. E. scholars of the 1910-1919 period as gainfully employed persons comprised several extra-Bengal centres. About 1943 they were to be found at Badarpur and Digboi in Assam, at Jamshedpur and Baidyanathdham in Bihar, at Lucknow in the U. P., at Raipur and Katni in the C. P., at Bombay and Madras, as well as at Lahore and Amritsar in the Punjab. It may be observed that those who found employment in the Punjab were Punjabis, the one at Madras was a South-Indian, and the one at Raipur in the C. P. was likewise a non-Bengali. During those days also as to-day, students from outside Bengal used to join the N. C. E. for technical education.

The relations of the Tisco¹ with the N. C. E. were very cordial even at the start. Both were virtually born together. It was the nationalist "ideas of 1905" with which the N. C. E. was associated. The first prospectus was issued by Tata in 1907 and the Tisco fired the first coke ovens in 1911. Tataism or the Tata spirit was in all essentials but a spark of the All-India *swadeshi* enthusiasm which took shape, among other things, in the mechanistic and techno-economic educational endeavours of the N. C. E.

It was in keeping with those ideals of *swadeshism* in technology, industry, commerce and scientific research that the promoters of the Tisco launched their endeavour. The *swadeshi* movement,—industrial, commercial, as well as financial,—was the general *milieu* of the beginnings of the

¹ For the origins and progress of the Tisco see B. K. Sarkar : *Economic Development* vol. II. (Calcutta, 1932, 1939), pp. 226-240. See also Fraser : *Iron and Steel in India* (Bombay 1919).

Iron and Steel Works at Jamshedpur. The Tatas were therefore as a matter of course benevolently orientated to the alumni of the N. C. E. in the matter of distributing their jobs among metallurgists, chemists and engineers. There was, in those days, an additional consideration. Pramatha Nath Bose, the Superintendent of the Government of India's Geological Survey, had been responsible for the discovery of the sites containing the iron ores on the strength of which the Tisco could be established. It so happened that on retiring from Government service Bose settled down in his home at Calcutta and came into intimate and creative contacts with Bengal Technical Institute and the N. C. E. as Rector. This personal *liaison* had something to do to invite the Tisco's sympathetic attention to the N. C. E.'s scholars.

Although a nationalist institution, the N. C. E. was in a position to have its scholars recognized and furnished with jobs by prominent British firms. Assam Oil Co., Balmer Lawrie & Co., Indian Iron and Steel Co. as well as the Railways were satisfied that the technical equipment demanded by them of their engineers and chemists was available in the schooling offered by the N. C. E. from 1906 to 1919.

Most of the occupations or professions enumerated above were virtually new for the Bengali, or for that matter, Indian intelligentsia. During 1910-19 the alumni of the National Council of Education, Bengal, constituted practically the first batch of young men looking for careers in mechanical, electrical, chemical and allied industries after a period of systematic schooling in a modern technical college. They are to be treated as the pioneers of Young Bengal qualified to promote industrialization and economic modernization by utilizing the country's natural resources and raw materials. Their name was not legion, nor were their designation, status and income in many instances perhaps of a high order. But they were breaking the ice.

The socio-economic structure of Bengal as of all India had been used to the profession of the lawyer, the medical man, the office clerk, and the school or college teacher of literary and philosophical subjects. The scholars that were turned out of the Government's Engineering College at Shibpur (Howrah) were chiefly civil engineers skilled in the building of roads and houses for municipalities and elsewhere. It is the N. C. E. engineers who commenced enriching the society with new professions nurtured by the tonic of machinery. The country began to get acculturated to technocracy, mechanics, chemical operations, electrical energies and so forth. The modernization of the people was set on foot as soon as families got associated with incomes derived from the machine-building, engineering, electrical, petrol, cement, chemical and other concerns. The pioneering of industrial careers for young men equipped with technocratic qualifications is a noteworthy contribution of the N. C. E. alumni of the period from 1910 down to 1919.

SECTION 3

The Progress of a Techno-Economic Primitive

By the standard prevailing in more advanced regions of Eur-America the records detailed here are perhaps hardly worth mentioning. The primitive character of these achievements lies on the surface. But so far as Bengal or for that matter India is concerned, they acquire a significance in the perspective of the fact that during 1910-19 the Government Engineering College at Shibpur delivered some 160 civil engineers only, i.e. not more than 16 per year. It is, besides, to be noted that at the Calcutta University Hemen Sen (1889-1945), the first professor of applied chemistry, was not appointed before 1920.

An index to the extent of primitiveness in Indian economic conditions as obtaining during the decade of the N. C. E.'s first fruits is furnished by the state of the *swadeshi* (indigenous) cotton mill industry. Out of a total of some 3,737,000,000 yards of machine-made piecegoods available in the market during 1909-14 only 30 per cent was the output of India's own mills, 70 per cent being imported from abroad.²

India's position in the world-map of machinism at 1913 can be ascertained to a certain extent if we place the value of machineries, tools and implements consumed by the inhabitants of this subcontinent in the perspective of machine consumption throughout the world. Some significant comparative statistics are available in *Die wirtschaftlichen Kräfte der Welt* (Berlin 1927). The following table indicates the total values (in Marks which are taken to be roughly equivalent to shillings for the purposes of this study) of machine consumption by India and twelve other countries as well as the percentage of each in the total world-consumption :

Countries	Million Marks of Machineries 'Consumed	Percentage of World- Consumption
A.		
1. U.S.A.	6,123	45.2
2. Germany	2,163	16.0
3. U.K.	1,002	7.4
4. Czarist Russia	816	6.0
5. Canada	479	3.1
6. France	410	3.0
7. Italy	258	1.9
8. Australia	152	1.0
9. India	139	1.0
B.		
10. Japan	109	0.8
11. South Africa	64	0.5
12. New Zealand	24	0.2
13. China	20	0.2

2 *Review of the Trade of India in 1930-31*, pp. 204-205.

We understand that India's consumption of machines was worth 139,000,000 Marks (or shillings). This constituted but 1 per cent of the total consumption throughout the world. This was the position in 1913, as furnished by "absolute statistics" for a huge subcontinent, peopled as it was by nearly three hundred million inhabitants. Machinism and technocracy as embodied or manifest in the consumption of machines, tools and implements was thus hardly worth while. India was a techno-economic primitive. The poverty and primitiveness of India in the purchasing power as regards machines would be still more in evidence if we appraise the above figures *per capita*, i.e., per head of population for each country. The picture of world-machinism from the standpoint of "relative statistics" is furnished by the following table which exhibits the same thirteen countries as consumers of machineries per head of population :

Countries	Machineries Consumed per Capita (in Marks)	Countries	Machineries Consumed per Capita (in Marks)
A.		B.	
1. U.S.A.	... 64	9. Italy	... 7
2. Canada	... 56	10. Czarist Russia	... 5
3. Australia	... 33	11. Japan	... 2
4. Germany	... 32	12. India	... 0.4
5. New Zealand	... 24	13. China	... 0.06
6. U.K.	... 22		
7. France	... 14		
8. South Africa	... 11		

It is brought out that India's consumption of machineries was only 0.4 Mark or shilling *per capita*. To understand it realistically we have but to watch the following equations which come out of the above table :

In the 1913 scale of machine consumption

1. U.S.A.	(64)	=	160 India (0.4)
2. Germany	(32)	=	80 India (0.4)
3. U.K.	(22)	=	55.5 India (0.4)
4. Japan	(2)	=	5 India (0.4)

It means that on the average the U.S.A. was consuming *per capita* 160 times as much machineries as the average Indian, and Japan 5 times as much, and so on. In so far as the consumption of machines is an index to modernism, efficiency, civilization and material or spiritual power the average American man, woman or child, was 160 times the average man, woman or child of India. This, however, is not to be taken as the only index in human personality.

Incidentally be it observed that for the purpose of effective and genuine comparison in industrialism, technocracy, economic energism, and socio-political power the really worth while figures are not those of absolute statistics for the entire population but those of relative statistics as furnished *per capita*. For instance, in the above survey Czarist Russia has a high place, the sixth, in absolute statistics. But in relative statistics she is the tenth in the list just above Japan and within measurable distance of India. We understand that in 1913 Russia was a techno-economic primitive of the modern world.

This point need not be stressed further in the present study. There is another important consideration. The real test of progress in mechanism, technocracy and industrialism is furnished not so much by the capacity of a people to purchase, consume or use implements and machineries but the ability to produce them. Die *Produktion der Produktionsmittel*, the production of the means to production, i.e., the manufacture of production-goods or capital-goods constitutes the *differentium* between

a highly or genuinely industrialized people and a low, primitive or seemingly industrialized people. It is necessary to observe that, thus considered, in the world-machinism statistics of 1913 India had no place. India was not a producer of machines worth the name. It was not one of the nine countries exhibited in the international survey of machine manufacture for that year.

Towards the beginnings of World-War I (1914-18) India was, then, nowhere as a producer of machines. This single fact establishes the techno-economic and socio-cultural background of the educational efforts of the National Council of Education in engineering and technology. It is with reference to this *milieu*, unmachinistic and un-technocratic as it is, that the work done by the Jadavpur engineers and technologists has to be measured and assessed. History, evolution and progress, as categories applied to Jadavpur, must have to refer constantly to the initial nothingnesses of modern industry and modern science in India during the first decade and a half of the present century. It is the modernization of a thorough-going primitive and the progress of a backward at virtually the zero level that is to be envisaged in the slow, tentative and snail-like advance consummated for the country and the people by the scholars turned out by institutions like the Jadavpur College of Engineering and Technology.

SECTION 4

The First Fruits of the N. C. E. as Pioneers of Industry and Commerce

Within the limitations of the standard of achievements prevailing in India, modest as it was in the world perspective, it is possible to draw attention to the work accom-

plished by several N. C. E. alumni of 1910-19 as possessing considerable importance in the industrial, commercial and scientific progress of the Bengali (and Indian) people. It is to be understood that public recognition began to be conferred on the activities of these men sometime during 1930-40. The first fruits (1910-19) of the N. C. E. have turned out to be the pioneers of a new techno-scientific spirit and a new techno-economic tradition.

The Techno-chemical Laboratory of Dr. Abinash Bhattacharya (Berlin) at Konnagar has done substantial experimental work in the field of industrial chemistry. The researches into hydrogenation and the oil industry carried on by Professor Banesvar Dass (graduate of Illinois, U. S. A.) have borne fruits such as are being utilized by business concerns. The electrical engineer, Biren Das-Gupta (graduate of Purdue, U. S. A.), has imported pumps, motors and Diesel engines for the Calcutta Corporation and other big parties and is responsible for the electrification of Jalpaiguri and Giridih. Further, he has succeeded in and through the Indo-Europa Trading Co. in helping forward the modernization of the printing industry as well as in educating quite a number of young intellectuals at Calcutta, Bombay, Madras and elsewhere in the mechanics of manufactures, installations, repairs and so forth. As a teacher of chemical engineering, Professor Hiralal Roy (graduate of Harvard, U. S. A., and Doctor of Berlin-Charlottenburg) is by all means one of the first in the field. He happens at present to be one of the two Indians who are full members of the Institution of Chemical Engineers, London. Professor Naren Sen-Gupta (Doctor of Harvard) is well-known in the scientific world as the pioneer of experimental psychology in India. The chemical and pharmaceutical industry knows Premananda Das (graduate of Michigan) as a hard-headed manufacturer and businessman in chemical products.

Suren Datta (graduate of Glasgow) has acquired a name because of his patent, "plycrete". The product has led to economy in iron and steel on account of its replacement by "concretized" jute. The electrical engineer, Suren Roy (graduate of Harvard), is a prominent businessman among indigenous manufacturers. He is the founder-manager of Bengal Belting Works and other concerns. Be it added that Roy has interested himself actively in the promotion of the N. C. E's interests in diverse ways. His contacts with publicists have been useful in this regard. Roy and his brothers like Nripen, Hemen, Kiron and Bimal have been maintaining the tradition of their father Lalit Roy's patriotism in regard to *swadeshi* industry and national education. Another electrical engineer, Bankim Roy (graduate of Illinois), has had a hand in the electrification of South Indian districts as well as Barisal and other parts of Bengal. He was the Lighting Superintendent of Calcutta Corporation for a long time.

The Asiatic Chemical Works of Jnanada Das-Gupta (graduate of Michigan) served to discipline Young Bengal in the handling of machinery as applied to chemical operations. The work of Suren Bal³ (another graduate from Michigan) in economic botany as Officer-in-Charge and Curator of the Industrial Section at the Indian Museum has likewise been noteworthy. Bal is President of the Indian Pharmaceutical Association and Vice-President of the Botanical Society of Bengal.

3 Author of (A) papers in the *Indian Journal of Pharmacy* 1939-41 ("Some Medicinal Plants of Kashmir", "Cinchona", "Ipecuenha", "The Papaya and Papain", "Essential Oil Yielding Plants of Bengal", etc.), (B) Catalogues of Exhibits in the Industrial Section of the Indian Museum published by the Government of India: (1) *Medicinal Plants* (1931), (2) *Fibre Plants* (1938), (3) *Food Fodder and Spice Plants* (1938), (4) *Useful Plants of Mayurbhanj State in Orissa* (1942), (C) *An Outline of Pharmacopocial Drugs of Vegetable, Origin* (1941) (D) Papers in Collaboration with Sunil Datta in *Science & Culture* (1944-45).

Jnan Das-Gupta (Doctor of Berlin) has settled at Hamburg as the founder of a chemical factory which produces formaldehyde among other things. He is the proprietor of some chemical patents in Germany. In the U. S. A. Hemen Rakshit (graduate of Wisconsin) has established himself as a businessman at New York, and Nabin Das (graduate of Iowa) at Charleston (South Carolina). Suren Kar (California) died as journalist in Germany, and Dhiren Sarkar (Yale, Michigan and Berlin) as industrial chemist and businessman in England. Rajen Chowdhury (Ohio) has been managing his farm in Malda and Khagen Mitra (Illinois) is active as scientific journalist. Jatin Set (Harvard) is Director of Industrial Development in Mayurbhanj State (Orissa) and Bejoy Sarkar (Harvard) teaches economics at Calcutta University. As a Superintendent of the Tisco (Jamshedpur) Sukumar Roy has won recognition on account of work in connection with benzole recovery, sulphuric acid, and coke oven by-products. At the Tata Laboratories (Jamshedpur) Dr. Kshirod Majumdar (Harvard) has introduced spectroscopic research in metal industry.

Pioneers of new industry and commerce have to be listed among these first fruits of the N. C. E.'s work (1910-19). It so happens that each one of them had a subsequent period of tuition and factorification in foreign countries. At the present moment the names of 30 foreign-schooled and foreign-factoried N. C. E. scholars of these classes are available. There are others among the N. C. E.'s scholars of the first decade who without the backing of education abroad have been able to do pioneering work of value. Upen Ghosh's records in match manufacture in connection with his Bangiya Diasalai Karyalaya is especially noteworthy because he had to manufacture some machineries also for the purpose. He is known likewise as the first manufacturer of metallic nibs in Bengal. Sambhu Banerjee of Bando Co. has to be

mentioned in the same context as a manufacturer and contractor of substantial importance, being well known, at any rate, as the first Bengali manufacturer of electric fans.

As the Chief Electrical Engineer of Lahore Electric Supply Company Banshidhar Pal has won good recognition. Hariram Sakuja is the proprietor of Punjab Metal Works at Amritsar. It is worth while to mention that Shib Ganguli is the author of books (in Bengali) on electrical engineering although he is Professor of Electrical Engineering at Maclagan Engineering College, Lahore, where the language of lectures and teaching is not Bengali. As Chief Chemist of the G. I. P. Ry. at Bombay, Biren Sen-Gupta has been rendering valuable service.

Some of the oldest "Old Boys" are to be found successful in non-techno-industrial lines. Satis Guha, Librarian of Darbhanga Raj Library and manager of *Benares Hindu University Journal* as well as editor of *Indiana* (Benares), Manoranjan Bhattacharya, a leading actor of the theatrical world, Prabhat Mukerjee, Librarian of Tagore's *Vishwabharati*, (some time Hem Basu-Mallik Professor of the N. C. E.), Amal Das-Gupta, one of the chief reporters of the *Statesman* (Calcutta), and Dr. Satyananda Roy, who died as Education Officer of Calcutta Corporation belong to the seniormost group—the classes of 1910-19. Guha continues his contacts with Satis Mukerjee (Dawn Society) until today at Benares and should be able to furnish biographical and ideological information ranging over forty years about this grand old man.

These men of 50-55 have, like the comrades of their classes 1910-19, compelled us by their activities to visualize the success of the National Council of Education's efforts. The crude and rough beginnings of techno-economic education at Bengal National College and Bengal Technical Institute during 1906-10 are within the memory of many publicists and

educators in India today. In that background the achievements of the first batch of the N. C. E.'s alumni are quite noteworthy. The contributions of these "Jadavpurians" of the first decade to industry, commerce, business organization, education, as well as scientific and industrial research are not negligible in a survey of modern Indian creativities.

Not the least remarkable feature about these "first fruits" are their devotion to *Alma Mater* and their strenuous efforts directed towards her betterment. These are the men responsible for the beginnings of the *renaissance* that has been in evidence on the Jadavpur Campus since 1927. That the very first batch of scholars should be up and doing in the interest of their *Alma Mater* and succeed in getting her enriched with grants from the Corporation of Calcutta and donations from among their friends as well as themselves is a phenomenon of rare importance in interhuman relations and social intercourse. They have succeeded, further, in communicating their enthusiasm to their younger comrades, the Jadavpurians of the second decade (1920-29), the third decade and so forth. They have thereby established a tradition of service and patriotism of which any educational institution can be deservedly proud.

The conflicts, failures and heroisms of many of these pioneers belonging to the classes down to 1919 have need to be recorded in the form of autobiographical sketches or souvenirs. These are no less valuable than the struggles, self-sacrifices and other experiences of the founders or fathers of the N. C. E. between 1905 and 1910. Perhaps the Silver Jubilee Committee of the Alumni Association will know how to collect the reminiscences and career-data of the Jadavpurians of the first decade and publish them in a convenient form. A publication like that would constitute a genuine contribution to the history of the N. C. E. and Jadavpur College.

PART IV

*The Achievements and Shortcomings of Today
(1920-45)*

CHAPTER I

The Jadavpur Engineers and Technologists (1920-29)

SECTION I

*The Jadavpurians of the Second Decade (1920-29)**

About 1943 the addresses of 258 Jadavpurians of the classes 1920-29 were available. Among them 26 or nearly ten per cent had a subsequent period of tuition and factorification in the U. S. A., Germany and the U.K.

In regard to these occupational addresses it is proper to observe that they are not to be taken as permanent. Virtually every Jadavpuri changed occupation according to convenience. Nobody's professional or occupational career is being systematically pursued in the present statements.

It is to be noted, besides, that the techno-industrial conditions of the country about 1920-29 cannot be guessed from the list of Jadavpur engineers and technologists belonging to that decade. It is only the situation of 1943 or thereabouts that we can to a certain extent envisage from the occupational report and figures analyzed here.

1. *Founders-Managers-Proprietors.* Some thirty-two of the alumni of the decade 1920-29 were connected with independent business. The manufacturing firms comprised such names as Toy Manufacturers (Chandernagore), Anupama Chemical Works, Eureka Printers and Cardboard Box-makers, Sakti Batteries, Pasupati Engineering Co., Oil Mill (Badarpur, Sylhet), Calcutta Plating and Engineering Co., Jadavpur Engineering Co., British India Construction Co.,

* Every Jadavpuri referred to in this Section is to be taken as belonging to the classes 1920-29.

Chatterjeeskay Bros., Majumdar Textile Co., Bagchi Co., Dhar Mandal Co., and Bhattacharya Co. Builders and Contractors' work was being done at Patna (Bihar), Faridpur, Bogra, Mymensingh, Barnagar and several stations in Calcutta. A tube-well contractor was functioning at Dacca, and an electrical contractor at Barnagar. Several Jadavpurians were known as merchants at Jamshedpur, and Batanagar. An export-import house was being run at Tokyo (Japan).

2. *Tata Iron and Steel Co.* Nearly thirty Jadavpurians were at work in different departments of the Tisco. A draftsman and a designer of the Energy and Economy Department, electricians of Plate Mills, Machine Shop, Power Plant, Coke Ovens, and Blast Furnace, and an electrical foreman of the Plate Mills were Jadavpur men. The designations of several were as follows: Shift Foreman (Coke Ovens), Power Plant Inspector, Electrical Foreman (Machine Shop), Electric Construction Foreman, Crane Inspector, and Shift Foreman (Plate Mills). Some were Foremen at Plate Mills, Cold Rolling Sheet Mills, Electric Construction, and General Maintenance, one was in charge of the Shift at Merchant Mill. The Electrical Department had several in different capacities. The Structural Section of the Engineering Department also had one.

3. *Machine Construction and Allied Works.* Jadavpurians were in service as engineers with Volkart Bros., T. E. Thomson Co., Wheel Watt Co., Everest Engineering Co., Douglas Frazer Co. and Burn & Co. The Ichapur Rifle Factory utilized the services of Jadavpur scholars as a foreman, a draftsman and a supervisor. A Jadavpur M. E. was naval engineer and architect at the Garden Reach Workshop. The engineers of Bengal Belting Works, P. P. De & Co., S. K. Chakravarti & Co., India Machinery Co., and H. K. Banerjee & Co. (Narayanganj) were Jadavpur men. They

were likewise with Jessop Co. as salesman and estimator, and the Mymensingh Water Works as Superintendent, Indian Steel & Wire Products Co. (Tatanagar) as foreman as well as with S. K. F. Ball-bearing Co. and Expanded Metal Manufacturing Works as engineers. The Resident Engineer and Manager of the Kasauli Power House (Simla) was an M. E. from Jadavpur. Over two dozen alumni of the 1920-29 classes were accounted for in this manner about 1943.

4. *Electrical Enterprises.* The electrification of Rangpur, Chittagong, Khulna, Dhubri (Assam), Patna (Bihar), Faridpur, Chapra (Bihar), Mirzapur (U.P.), Dacca, Moradabad (U.P.), Sylhet (Assam), Rajshahi, Midnapur, Nasik (Bombay), Mymensingh, Rampur State (U.P.), Bombay, Naihati, Dibrugarh (Assam), Gauhati (Assam), Pabna, Delhi, Lucknow, Chandernagore and Narayanganj (Dacca) was being helped forward by Jadavpur scholars. They were in employment of the Electric Supply Companies located at these centres from Delhi and Bombay to Dibrugarh as engineers, managers, and so forth.

Some of these scholars found employment also with S. K. Roy & Co., Bengal Belting Works, and Bengal Electric Lamp Works. Big enterprises like the A. E. G. (India), Jessop Co., Tide Water Oil Co., the G. E. C., and Mackintosh Burn & Co., were making use of Jadavpurians as engineers. The Engineer in Chief of the Kashmir House at Delhi was an E. E. of Jadavpur. Jadavpurians were also in employment as engineers at the International G. E. C. (Bombay) and as superintendent at the Power House of Delhi Cantonment. Some four dozen E. E's of Jadavpur 1920-29 were in evidence in that occupation about 1943.

5. *Chemical Concerns.* In the chemical line Jadavpur scholars were in evidence as engineers at Napier Paint Works, Bengal Paper Mills, Bengal Chemical and Pharmaceutical Works, and Bengal Immunity Co. As chemists

they found employment with the Munition Factory at Khirkee (Poona), Imperial Chemical Industries, Union Drug Co., Bengal Immunity Co., Tata Oil Mills (Tatapuram), and Dunlop Rubber Factory (Hooghly). The soap technologist of the B. C. P. W. was likewise a Jadavpur man.

6. *Railways and Tramways.* Some twenty Jadavpur alumni of the decade 1920-29 were in service with the Railway and Tramway Companies about 1943. The Calcutta Tramways, the Delhi Electric Tramways, the B. A. Ry. (Katihar), the G. I. P. Ry. (Bombay), the N. W. Ry. (Taxila), the B. N. W. Ry. (Chapra) and the B. A. Ry. had Jadavpurians on their respective staffs. The Locomotive Engineer of the Loco Shed at Rohri (N. W. Ry. in Sind), the Signal Inspector of the B. N. Ry. at Tatanagar, the Bridge Inspectors of the B. N. Ry. (Calcutta) and the B. N. Ry. (Kolaghat), and the Engineer of the Car Shed of the B. B. & C. I. Ry. at Bombay were Jadavpur men. The E. B. Ry. at Sealdah (Calcutta) had some of them on the staff as draftsmen.

7. *Cement Works.* A Jadavpurian of the Chemical Engineering Department (1920-29) was in service with the Assam-Bengal Cement Co. at Chhatak (Assam) about 1940.

8. *Petrol.* Jadavpur (1920-29) contributed engineers to the Assam Oil Co. (Digboi), Burmah Oil Co. (Tharawadi) and Standard Oil Co. of New York (Budge-Budge).

9. *Collieries.* A Jadavpur scholar was in the employ of the Assam Mining Corporation. The electrical engineers of the Ore Mines at Goa (Singhbhum) as well as at Jhagarkand Collieries were men from Jadavpur. The Copper Mines at Ghatsila also had their mechanical engineer from among Jadavpurians.

10. *Textile Mills.* Several engineers of the Birla Jute Mills (Budge-Budge), the Dhakeswari Cotton Mills (Dacca), and the Basanti Cotton Mills belonged to the Jadavpur Group. Several Shift engineers of the Kamarhatty Jute Mills and the Basanti

Cotton Mills were likewise Jadavpur men. The manager and the electrical engineer of the Bharat Jute Mills (Howrah), the Head Electrician and Draftsman of the Rameswar Jute Mills (Samastipur) and the chemist of the Belvedere Jute Mills (Howrah) also were Jadavpurians.

11. *Sugar Mills.* The mill engineer of the Radha Krishna Sugar Mills at Beldanga was a Jadavpur scholar. Jadavpur supplied the electrical engineer for the Darsana Sugar Mills at Calomb. The chemist of the Sugar Works at Poona (Bombay) was likewise a Jadavpurian.

12. *Glass Works.* A Jadavpurian of 1920-29 was the engineer of the Kaycee Glass Works Ltd. of Shikoabad (U. P.).

13. *Paper Mills.* Two Jadavpur scholars were functioning in two paper mills as chemists. The Titagarh Paper Mills had one. The second was employed at the Sripur Paper Mills (Hyderabad, Dn.).

14. *Oil Mills.* The electrical engineer of the Surajmal Oil Mills Co. was a Jadavpur scholar.

15. *Printing.* Three engineers of Jadavpur were in service with the Ananda Bazar Printing Press.

16. *Tea Estates.* Three tea-estates got their mechanical or electrical engineers from Jadavpur. These were the Nimtijora Tea Estate (Kaldini Dooars), Malapatti Tea Estate (Jalpaiguri) and Choibari Tea Estate (Jalpaiguri).

17. *Calcutta Corporation.* About a dozen Jadavpur engineers were in service with the Calcutta Corporation in diverse capacities. One was the Superintendent of the Palmers Bridge Pumping Station, one was the overseer of the Water Works, one was the Switch Board Attendant of the Tala Pumping Station. The engineer of the Tala Pumping Works, the electric supervisors of the Lighting Department, and the Shift Engineer of the Maniktola Pumping Station also were Jadavpur men.

18. *Calcutta Telephone Corporation.* Four Exchange Ins-

pectors of the Calcutta Telephone system were engineers from Jadavpur.

19. *Calcutta Electric Supply Corporation.* In 1943 a Meter Inspector and a Senior Tester of the C. E. S. C. were Jadavpurians of 1920-29. One was employed as engineer.

20. *Calcutta Port Trust.* The Port Trust Administration of Calcutta (c. 1943) had on the staff two Jadavpur engineers of 1920-29. One was an assistant foreman and the other an electric supervisor.

21. *Teaching.* Of the Jadavpurians of 1920-29 nearly thirty were on the teaching staffs of educational and research institutions about 1943. Jadavpur College absorbed sixteen. The Calcutta University's Department of Linguistics had a Jadavpurian who possessed Doctorates of Munich and Paris. A Jadavpurian was likewise in the Department of Agriculture of the Calcutta University. The technical schools at Comilla, Kanchrapara, Bishnupur, Bankura, Khulna, and Jessore each had one Jadavpurian as teacher or superintendent. Jadavpur alumni were represented on the teaching staffs of the Government School of Handicraft at Akola (Berar), the Reformatory School at Hazaribagh (Bihar), and the Patna Science College. One was in service at the Imperial Institute of Sugar Technology at Cawnpur (U. P.).

22. *Government and Municipal Services.* Over a dozen Jadavpurians of 1920-29 were in Government and municipal services about 1943. The Government of Assam took one mechanical engineer, the Chittagong Telegraph Office one Upper Air observer, the I. S. 'D. Government Laboratory at Tatanagar one chemical assistant, the Stores Directorate of the Supply Department at New Delhi one engineer, the P. W. D. (Calcutta) one electrical overseer and one inspector. The Director of Industries at Nagpur (C. P.) at this time was a Jadavpurian. A foreman and a chemist of the Government

Test House at Alipur were Jadavpurians. The Water Works at Satkhira and Purneah (Bihar) had Jadavpurians as superintendents. One Jadavpur engineer was the overseer of the Tollygunge Municipality and another was the electrical overseer of the P. W. D. at Chapra (Bihar).

23. *Miscellaneous.* The electrician of the Purna Theatre was a Jadavpur man. So also was an expert of the Universal Art Gallery (Photographers).

SECTION 2

World-Technocracy (c. 1925-29)

The educational urges of the Jadavpurians of the classes 1920-29 have to be sought to a considerable extent in the incentives to mechanization and industrialization furnished to all economically backward regions by World-War I (1914-18). Reports from Eur-America supplied daily by Reuter and other agencies about the Herculean reconstructions in manufacture, transportation, banking and commerce on account of inventions and discoveries were somewhat instrumental in inspiring Young India along engineering and techno-economic educational channels. The fortunes of the Jadavpur College were thus integrally associated no less with the giant world-economic and world-technocratic developments than with the pigmy although sincere and strenuous efforts at industrial progress made by Indians themselves.

A bird's eye view of the international trends in inventions and discoveries is quite relevant here. During the third decade of the present century the world-standard in technocracy was set, among other things, by the manufacture of raw materials. Artificial (chemical) fertilizers were taking the place of the natural (animal) manures. Natural raw silk was being replaced by artificial silk (rayon). Artificial wool was likewise already a fact. The only technical problem

that remained to be solved in this field about 1930 was the reduction of the heat-transmission of the fibres produced. Another *fait accompli* of world-technocracy was artificial cotton. The only problem consisted in the reductions of the price. The scientific laboratories had manufactured rubber. Old rubber could be regenerated so much that rubber was considered to be almost an eternal commodity. Benzene was extracted from coal (brown coal). This liquid coal used to be delivered at the same price as benzene oil.¹

Indian markets had been used to artificial indigo or aniline dyes for a long time. Rayon (artificial silk) was now invading the commercial world of India. But in regard to other artificial products, *i.e.* the creation or manufacture of raw materials both science and technology in India were hardly yet conscious. As for educational institutions they naturally failed to react to the impacts of the latest inventions on teaching and research.

Another slogan of Eur-American technocracy in those days was rationalization.² As a result of *Rationalisierung* in Germany the output of coal per worker per day rose from 943 kilograms in 1913 to 1128 kg. in 1925. It was being demonstrated that in spite of introduction of machinery,—or rather because of it nearly 600,000 new working men found employment every year in pre-1913 Germany. On account of rationalization in England beef culture took 18 months in the place of three years. In Germany the same amount of sugar was produced with decreased amount of beet. In 1927 Germany required 33,000,000 t of coal less than would have been necessary in 1900 in order to produce 18,000,000 tons of steel. The saving of coal was enormous.

1 W. Woytinsky: *Die Tatsachen und Zahlen Europas* (Vienna 1930), pp. 124-127.

2 Hirsch: *Die Bedeutung der Rationalisierung für das deutsche Wirtschaftsleben* (Berlin 1928), pp. 59-64, 206.

By 1929-30 Japanese industry had likewise been steeled in the elimination of waste in manufacturing and management. The overhauling of steam locomotives was accomplished in 5 days in contrast with the 30 days of 1916. At this time 400 man-days were required in the place of 900 man-days of old. The overhauling of electric locomotives at the Omiya Railway Works took 283 man-days in 1932 (523 man-days in 1922)³.

Thanks to newspaper reports which became rather prompt and upto-date in post-1918 years rationalization as a techno-economic category was getting known in India. As for the giant industrial establishments like the railways, the iron and steel works, oil companies etc. they were making use of some of the rationalizing devices. But, on the whole, rationalization was far from having a mentionable effect in Indian industry and commerce.⁴

SECTION 3

The Extent of India's Industrialization (c. 1925-29)

About 1,500,000,000 horse power was the world output at this time (c. 1925-29). The relative output of work per person as dependent on the power-machine factor for this period can be seen somewhat concretely although approximately in the following table⁵:

3 Asahi: *The Secret of Japan's Trade Expansion* (Tokyo 1934) pp. 22-41.

4 B. K. Sarkar: "Trusts and Rationalization: Aspects of the New Industrial Revolution" (*Journal of the Bengal National Chamber of Commerce*, October 1927) and *Economic Development*, Vol. II. (Calcutta 1932), Chapter on Traces of Rationalization in Indian Business Enterprise.

5 Chase: *Men and Machines* (New York, 1929), p. 89.

that remained to be solved in this field about 1930 was the reduction of the heat-transmission of the fibres produced. Another *fait accompli* of world-technocracy was artificial cotton. The only problem consisted in the reductions of the price. The scientific laboratories had manufactured rubber. Old rubber could be regenerated so much that rubber was considered to be almost an eternal commodity. Benzene was extracted from coal (brown coal). This liquid coal used to be delivered at the same price as benzene oil.¹

Indian markets had been used to artificial indigo or aniline dyes for a long time. Rayon (artificial silk) was now invading the commercial world of India. But in regard to other artificial products, *i.e.* the creation or manufacture of raw materials both science and technology in India were hardly yet conscious. As for educational institutions they naturally failed to react to the impacts of the latest inventions on teaching and research.

Another slogan of Eur-American technocracy in those days was rationalization.² As a result of *Rationalisierung* in Germany the output of coal per worker per day rose from 943 kilograms in 1913 to 1128 kg. in 1925. It was being demonstrated that in spite of introduction of machinery,—or rather because of it nearly 600,000 new working men found employment every year in pre-1913 Germany. On account of rationalization in England beef culture took 18 months in the place of three years. In Germany the same amount of sugar was produced with decreased amount of beet. In 1927 Germany required 33,000,000 t of coal less than would have been necessary in 1900 in order to produce 18,000,000 tons of steel. The saving of coal was enormous.

1 W. Woytinsky: *Die Tatsachen und Zahlen Europas* (Vienna 1930), pp. 124-127.

2 Hirsch: *Die Bedeutung der Rationalisierung für das deutsche Wirtschaftsleben* (Berlin 1928), pp. 59-64, 206.

By 1929-30 Japanese industry had likewise been steeled in the elimination of waste in manufacturing and management. The overhauling of steam locomotives was accomplished in 5 days in contrast with the 30 days of 1916. At this time 400 man-days were required in the place of 900 man-days of old. The overhauling of electric locomotives at the Omiya Railway Works took 283 man-days in 1932 (523 man-days in 1922)³.

Thanks to newspaper reports which became rather prompt and uptodate in post-1918 years rationalization as a techno-economic category was getting known in India. As for the giant industrial establishments like the railways, the iron and steel works, oil companies etc. they were making use of some of the rationalizing devices. But, on the whole, rationalization was far from having a mentionable effect in Indian industry and commerce.⁴

SECTION 3

The Extent of India's Industrialization (c. 1925-29)

About 1,500,000,000 horse power was the world output at this time (c. 1925-29). The relative output of work per person as dependent on the power-machine factor for this period can be seen somewhat concretely although approximately in the following table⁵:

3 Asahi: *The Secret of Japan's Trade Expansion* (Tokyo 1934) pp. 22-41.

4 B. K. Sarkar: "Trusts and Rationalization: Aspects of the New Industrial Revolution" (*Journal of the Bengal National Chamber of Commerce*, October 1927) and *Economic Development*, Vol. II. (Calcutta 1932), Chapter on Traces of Rationalization in Indian Business Enterprise.

5 Chase: *Men and Machines* (New York, 1929), p. 89.

Countries	Relative Work output per man	Countries	Relative Work output per man
1. China	1.00	7. Germany	12.00
2. India	1.25	8. Belgium	16.00
3. Soviet Russia (before plan I)	2.50	9. Great Britain	18.00
4. Italy	2.75	10. Canada	20.00
5. Japan	3.50	11. U. S. A.	30.00
6. France	8.25		

Relatively speaking, India (1.25) was thus almost on a par with China (1.00). Soviet Russia (2.20) was not far ahead of these primitives and somewhat behind Italy (2.75) and Japan (3.50). It is obvious that the impacts of World-War I (1914-18) on India in regard to technocracy were not very palpable by the international or world-standard.

The output of steel in the Tata Iron and Steel Works at Jamshedpur was as low as 320,000 tons in 1926 and 408,000 tons in 1928.⁶ The total steel output of the world came upto 109,400,000 t. In coal output India's figure was 22,000,000 t. (world total : 1,225,000,000 t).

In 1928 out of the world-total of 3,300,000 looms India had only 162,000. The total world-spindleage was at 165,100,000 in which India's share was represented by 8,700,000. India consumed 476,000 tons of raw cotton while consumption in the world's mills totalled 5,658,000 t.

Trade union membership is an index to industrialization and technocratic development. Now in 1927 India did not possess more than some 409,000 organized working men, i.e. trade union members in a total population of about 319,000,000. Per 10,000 inhabitants India had some 13 trade union members while Soviet Russia⁷ had 600, England and

⁶ *The Annual Reports of the Tisco* from 1925 to 1929 (Bombay): Woytinsky: *Die Tatsachen und Zahlen Europas* (Vienna, 1930) p. 120.

⁷ *Reichsarbeitsblatt*. 36. Sonderheft (Berlin 1927).

France had each 1,100, Germany 1,300 and Australia 1400. The organized labour power of the entire world was at that time numbered at 41,000,000.

Neither absolutely nor relatively was India's techno-industrial progress a matter for considerable satisfaction. Statistically also the indices could not possibly evoke much enthusiasm. But in the Indian perspectives the transition was palpable, especially in the estimation of intellectual and middle class families. Besides, the ideological atmosphere both abroad as well as at home was one of remakings, transformations, reconstructions, technical inventions, scientific discoveries, industrial research, commercial expansion. The impacts of all this progress-ideology in the techno-industrial *milieu* on the Jadavpur College were immense. It is in this background that the second decade of its history has to be analyzed.

SECTION 4

Jadavpur College in the Perspective of Indian Technological Education (c. 1925-29)

The successful Jadavpurians of the classes 1920-29 were numbered as follows in five different groups :

Year	M.E.	E.E.	Ch. E	Primary Tech. or Junior Tech.	Survey & Drafts. manship.	Total
1920	4	4	...	13	8	29
1921	7	4	...	11	3	25
1922	11	3	...	5	2	21
1923	27	15	...	13	4	59
1924	12	25	...	25	5	67
1925	14	44	9	Jr.23	7	97
1926	9	51	7	13	9	89
1927	19	37	8	15	5	84
1928	8	14	4	11	11	48
1929	6	18	8	13	8	53
Total	117	215	36	142	62	572

The total passes for the decade as engineers were counted at 368. Including the juniors and the surveyors etc., the total number came up to 572. Electrical engineering commanded the predominant choice of scholars. It is to be noticed that the first batch of chemical engineers came out in 1925.

The output of engineers at Jadavpur was at the rate of 37 per year during the decade. This picture is to be seen in the background of the classes 1909-19 which turned out a total of 197 among whom there were 56 engineers. The decade 1920-29 with 368 engineers was, therefore, relatively speaking, a somewhat prosperous period. The impact of World-War I on engineering and technological education, especially on the National Council of Education's endeavour was considerable.

The number of students on the rolls for the decade 1920-29 is exhibited below :

Year	No.	Year	No.
1920	250	1925	635
1921	652	1926	650
1922	661	1927	585
1923	650	1928	556
1924	700	1929	500

The annual average for the decade was 584. The steady decline during the three years 1927-29 is quite palpable. The decline of the industrialization animus furnished by World-War I among the middle class families is perhaps partly to account for this decline in the number of students. The technocratic boom in the field of education reached its zenith in 1924. Evidently large scale industries were not considerable and prosperous enough to offer a steady and substantial demand for engineers such as might be supplied by Jadavpur.

Let us have a survey of techno-industrial education in all Bengal (minus the States). For 1925 we get the following picture :

Categories of Institutions	Number of Institutions	Scholars	Total Population
I. Higher (College)	... 1	321	47,000,000
II. Lower (Schools)—			
(a) Engineering	... 3	574	
(b) Technical and Industrial	135	4,968	
	139	5,863	47,000,000

For a total population of nearly 47 millions the number of engineering and industrial scholars, both high and low grades combined, was or nearly 6,000. The "higher" institution referred to in the above table is the Bengal Engineering College at Shibpur. The National Council of Education's efforts in technical and engineering education are not exhibited in the foregoing statement. At any rate we get 1.3 scholars per 10,000 inhabitants.

Incidentally be it observed that Jadavpur had 635 scholars in 1925 while Shibpur had 321. Shibpur catered chiefly for civil engineering while Jadavpur for mechanical, electrical and chemical.

The following pattern of techno-industrial education can be obtained for All-India (minus Indian States) :

Categories of Institutions	Number of Institutions	Scholars	Population
I. Higher (Colleges)	6	1,486	247,000,000
II. Lower (School)			
(1) Engineering	12	1,224	...
(2) Technical and Industrial Schools	316	14,483	...
	334	17,193	247 000,000

The number of scholars in engineering, industry and technological subjects, all grades combined, was something above 17,000 for a total population of 247 millions. This meant 0.7 per 10,000.

Bengal per 10,000 inhabitants had 1.3 scholars in the perspective of all India's 0.7. The following equation is obvious :

$$\text{Bengal (1.3)} = 1.9 \text{ India (0.7)}.$$

Numerically speaking, engineering and technological students in Bengal were 1.9 times or double those of India. The Bengal average was thus higher than the Indian⁸.

We have not gone into the subjects studied or the standard of teaching in the higher and the lower grades of institutions. All the same, it is worth while to note that so far as education for industrialization and economic modernization is concerned, the general Indian average for c. 1925 was 0.7 scholars per 10,000 inhabitants, the Bengal average being 1.3.

We shall now have a look at the financial side of Jadavpur College. The total expenditure comprising the items on construction, equipments and library was in round figures as follows from 1925 to 1929 :

Year				Expenditure
				Rs.
1925	...	...	...	368,000
1926	...	...	...	351,000
1927	...	...	...	453,000
1928	...	...	...	404,000
1929	...	...	...	238,000
			Total Rs.	1,814,000

During five years the total expenditure was Rs. 1,814,000. The annual average was Rs. 362,800. As we have noted, this

⁸ The figures are derived from *Indian Education in 1926-27* and *Report on Public Instruction in Bengal for 1926-27*.

included the costs of construction, equipment and library. It has to be observed that this quinquennium was rather exceptional in the matter of capital expenditure. Very little,—hardly anything,—was spent on construction and equipment from 1930 to 1942 (or 1943).

The exceptional items (construction and equipment) accounted for the following figures from 1925 to 1929 :

Year	Construction and Equipment			
1925	117,000
1926	189,000
1927	62,000
1928	86,000
1929	22,000
			...	476,000

The total capital expenditure during 1925-29 was Rs. 476,000, the annual average being Rs. 95,200.

Excluding this capital expenditure the total expenditure for the quinquennium was Rs. 1,338,000, of which the annual average was Rs. 267,600.

These items of expenditure may be placed in the perspective of the average number of students from 1925 to 1929. This was 585. Per head of students the annual expenditure p.a. was then Rs. 457 (without construction and equipment). Taking all the items together, i.e., the annual average of Rs. 362,800 the *per capita* expenditure p.a. was Rs. 620.

SECTION 5

Indian Technological Education by the "Great Power" Standard (c. 1925)

We shall now make a brief survey of the facilities for education in industry, technology and engineering available

for the peoples of the world's "great powers". A complete picture is hardly presentable. The figures obtainable cannot in any case be compared with one another. It is not intended to furnish more than a very rough and approximate idea of the kind of technological education offered by these countries and the number of scholars taking advantage of the facilities that exist.⁹

Techno-industrial education in France comprised the following three grades of institutions in 1925-1926¹⁰ :

- I. Higher : 1. *Conservatoire des Arts et Métiers* (Paris),
2. *Ecole Centrale des Arts et Manufactures* (Paris),
3. *Ecole Polytechnique* (Paris), 4. *Ecole des Mines* (Paris, St. Etienne, Alais, Douai), 5. *Ecole des Ponts et Chaussées* (Paris).
- II. Intermediate : 1. *Ecole nationales des arts et métiers* (6), 2. *Ecole nationales professionnelles* (6) with 2536 scholars, 3. *Ecole pratiques de commerce et d'industrie* (65 institutions for boys, 17 for girls) with 42,409 scholars.
- III. Lower : 1. Schools of industries (35), 5,550 scholars, 2. Municipal professional schools in Paris (13), 1,385 scholars, 3. Private schools (370) 92,000 scholars.

Total 418 : 98,935 scholars.

The chapter on *Instruction publique* in the *Annuaire Général* (Larousse, Paris 1928) does not contain figures about

⁹ This section is based on the *Annuaire Général* (Paris 1928), the *Statistisches Jahrbuch für das Deutsche Reich* (Berlin 1928), *Movimento Economico dell'Italia* 1928, the *Statesman's Year Book* (London 1926), the *American Year Book* (New York 1926), *The Fiftieth Annual Report of the Minister of State for Education 1922-23* (Tokyo 1927), the *Japan Year Book* (Tokyo 1928), and the *U. R. S. S. Annuaire Politique et Économique 1925-26* (Moscow 1926).

¹⁰ For details about technical and engineering education in France see B. K. Sarkar : *Economic Development*, Vol. I. (Madras 1926).

all the categories. The only figures available are, as we have noticed above, the following :

1. Intermediate schools of two categories	...	44,945
2. Lower schools	...	98,935

Total : ... 143,880

In these few schools alone there were nearly 144,000 scholars. The training of *mistris* or technicians ("*mistrification*") was quite considerable.

The population of France about this time was nearly 41,000,000. Even with incomplete figures, very incomplete indeed, especially in regard to the higher engineering grades,—we get 35 scholars per 10,000 inhabitants. Although no comparison is possible on account of the relative absence of figures from the French side we may place Bengal's 1.3 by France's 35.

Technical and professional education was organized by the *loi Astier* (Astier Act) of 1919. Compulsory free courses were introduced for workingmen of the school-age. According to an article by H. Curiot in *La Formation Professionnelle* (Paris 1916) 80,000 engineers were available for 5,000,000 workingmen. There was thus one engineer employed as "officer" for 60 "men". It was also reported that, generally speaking, 2000 engineers came out of the techno-industrial colleges and some 400 experts of the engineer type could be depended upon as the annual output from factories and workshops. This, of course, was the situation of "*mistrification*" in France during World-War I. (1914-18).

In 1925 techno-industrial education of the University standard was offered in Germany through 10 *Technische Hochschulen* (26,126 scholars) and 2 Mining Colleges (1,381 scholars)¹¹. The total number of highest grade scholars

11 The material for technical and professional education in Germany is derived in the main from Kuehne (editor): *Handbuch für das Berufsbildungswesen*.

in engineering, technology and mining was then 27,507. Intermediate technical education was offered through 60 architecture schools (12,730 scholars), 35 metal industry schools, 85 schools of industrial arts, 11 mining schools in Prussia (1,759 scholars) and numerous other institutions. There were many specialized institutions of the intermediate standard, e.g., for imparting instruction in 1. smithies, 2. installations, 3. instruments and machine tools, 4. clocks and watches, 5. precious metals, 6. wood carving, 7. toys, 8. musical instruments, 9. chemical engineering, 10. paper manufacture, 11. dyeing, 12. soap making, 13. bricks and tiles, 14. porcelain, 15. glass, 16. photography, 17. leather industry, etc. Special professional schools for women were classed as (1) industrial schools (*Gewerbeschulen*) and (2) technical schools for the training of *Assistentinnen* (assistants). Regrettably enough, it has not been possible to collect the statistics for these specialized technological schools of the intermediate standard.

These intermediate technical schools had diverse names. They were called *Berufs-schulen* (Professional Schools). The name *Fachschulen* (subjects-schools) was often in use. Very often they were indifferently known as *Technikum* (technical institutions). “*Mistrification*” for boys and “*nursification*” (training in social work) for girls were well taken care of in very many ways through this jungle of techno-professional schools.

Nearly 706,000 scholars were registered in 4,791 *Fortbildungs-schulen* (continuation or “vocational” schools). These schools were diversely named, e.g., trade schools, industrial schools, factory schools, railway schools, mining schools, etc. The scholars were employees of the age-group

und-Fachschulwesen (Leipzig 1928). See the chapters on German industrial, engineering and technological education in B. K. Sarkar: *Economic Development*, Vol. I. (Madras 1926).

14-18 in factories or workshops. The law compelled the employers to offer adequate educational facilities to these young employees.

Neither the lists of schools and colleges nor those of scholars are complete or exhaustive. But we get a rough estimate of scholars from these partial reports as follows:

I. <i>Hochschule</i> ¹² (University) Standard	...	27,507
II. Intermediate	„	14,489
III. Continuation or "Vocational"	...	706,000

	Total: ...	747,996

However incomplete the figures be, we get some 748,000 for a population of nearly 63,000,000. This yields 120 per 10,000 inhabitants (Bengal 1.3; India 0.7).

In 1924 there were 8 Engineering Colleges in Italy with 5,809 scholars. There were, besides, 148 scholars in a college of industrial chemistry. The total was round about 6,000 (Population nearly 40 millions).

In the U. S. A. the number of Agricultural and Engineering Colleges run by the State was 68 in 1921. The students enrolled were some 190,000.

We understand from the *Statesman's Year-Book* that higher technological education was offered in England-Wales through 44 institutions during 1924-25. The number of scholars was 4074. There were 95 Day Technical Institutes. Full time scholars were 9,223 and part-time 3,691. Junior technical schools were 89 in number with 11,954 scholars. The total number of scholars was about 29,000 (Population 39 millions). We get 7 per 10,000 inhabitants (Bengal 1.3, India 0.7). The U.K. was, then, quite keen on *mistrification* and "nursification."

¹² *Hochschule* does not mean "high school" or higher school of the conventional sense. It is equivalent to University.

For Japan 1922-23 we get the following picture of technological education :

<i>Institutes</i>		<i>No.</i>	<i>Scholars</i>
I. Higher Technical Colleges	...	15	4,836
II. Intermediate Technical Colleges			
1. Technical	...	100	21,295
2. Industrial	...	78	15,606
III. Continuation Technical Schools	...	120	8,236
<hr/>			
Total	...	313	49,973

There were thus some 50,000 scholars in engineering, industry and technology for a population of nearly 60 millions. This gives 6.3 per 10,000 inhabitants (Bengal 1.3, India 0.7).

The pattern of technological education in Soviet Russia during 1924 comprised the following items :

<i>Institutes</i>		<i>No.</i>	<i>Scholars</i>
I. Higher Institutes	...	27	43,956
II. Intermediate ,,	...	219	42,460
III. Lower ,,	...	719	54,790
<hr/>			
Total	...	965	141,206

For a population of nearly 140,000,000 Soviet Russia had something over 141,000 scholars in industry, engineering and technology before the Gosplan I started in October 1928. This implies more than 10 per 10,000 inhabitants (Bengal 1.3, India 0.7).

The urge for “*mistrification*” and “*nursification*” in Soviet Russia was thus quite in evidence in 1924.

We have placed the figures for Bengal and All-India by the side of those from other countries. But no comparison is scientifically possible between Bengal or India and the other countries or between those countries themselves. The reason is obvious. The figures for the U.K., the U.S.A., Italy, Japan, Soviet Russia, France and Germany are by all means incomplete.

SECTION 6

Techno-Industrial Celebrities of the Classes 1920-29

Among the alumni of 1920-29 several commenced acquiring distinction in industry and commerce about 1940. They are at present between the ages of thirty-five and forty-five. Some of them are being singled out in the following statement. It is worth while to observe that even those alumni who did not finish their final examination at College are being mentioned here as in other contexts. Not every prominent success in business and other branches of practical life is being attributed to brilliancy in school career or high records in examination. Indeed, some of those Jadavpurians who have won distinction in industry and commerce but failed in the College examination or could not complete the courses may be granted "Hon." Bachelor degrees in Engineering in case they should come forward with substantial donations for their *Alma Mater*.

Jyotish Datta started as builder of rickshaws and is now known as manufacturer of wooden toys. The technical skill of Kali Datta has been an important factor in the business success of the contractors, P. P. De & Co. As manufacturer of hosiery machines, Moni Majumdar has made a name. The electrical engineer, Nihar Datta-Roy is a substantial support of Indra Singh's Wire and Steel Products (Jamshedpur). As colleague of Alamohan Dass, Mahendra Kundu, the mechanical engineer, has a valuable record in the work of jute mills as of other enterprises. Susanta Chatterjee of Chatterjeeskay Bros. is running a well-organized business in installations, fittings, repairs and constructions. The mechanical engineer, Sudhir Datta, proprietor of British India Construction Co., and the electrical engineer, Joy Bhattacharya, also proprietor of a business concern at Shillong (Assam) are well recognized for their services to the

customers. Among the engineers of the Calcutta Corporation, Deben Chakravarti (Glasgow), Superintendent of Palmers Bridge Pumping Station, has a reputation.

The work of several chemical engineers deserves notice. Debi Sen's work at the Indian Stores Department Government Laboratory of Tatanagar (Bihar), Satyen Sen's at the Munition Factory (Kirkee, Bombay), Woomesh Sen-Gupta's at the Government Test House (Alipore), Atul Datta's at the Assam Mining Corporation, Tamohar Gupta's at Kaycee Glass Works (Shikoabad, U.P.) and Motilal Sahoo's at the Bengal Chemical and Pharmaceutical Works may be referred to in this connection. None of them had been to foreign countries. Datta and Sahoo are at present in independent business as founders and experts of the Jadavpur Soap Works. In the line of donations to the *Alma Mater* fund Datta has made a fine beginning.

Among chemical engineers of the period in question who later equipped themselves with American, British or German training, Karuna Guha (Liverpool), Director of Industries at Nagpur, Professor Narayan Vidyarthi (Liverpool) of Patna Science College, Jatin Mukerjee (Dr. of Engineering, Stuttgart) of the Tata Oil Mills (Tatapuram, Cochin) and Santosh Jana (Massachusetts Institute of Technology, Boston) of the Sripur Paper Mills at Kothapetta (Hyderabad, Dn.) have been representing the Jadavpur alumni far and wide in India. Guha is at present Deputy Director of the Central Planning Board of the Government of India at Delhi. Jana is in charge of the Canadian Aluminium Corporation's Laboratory at Muri (B.N.Ry.). As manufacturer of storage batteries, Madhu Majumdar (American trained), proprietor of Sakti Batteries, is a well-known industrialist of Calcutta. Altogether, the addresses of some 30 foreign-schooled and foreign-factoried Jadavpurians of the classes 1920-29 are available.

As foreman and shift engineer of the Calcutta Electric Supply Company at the Cossipore Power Station Amulya Sen-Gupta has made a name. Principal Amar Haldar of the Institute of Engineering Technology (Calcutta) and Director, Development of Industries Ltd., has won fine distinction. The Indian Spray Painting Works have enabled Sisir Mitra to exhibit his talent as manufacturer of spray painting machines as well as miscellaneous chemicals. The firm of Dhar Mandal & Co., mechanical engineers, owes its reputation substantially to the work of Hariram Dhar. Bhim Sein Mehra, the proprietor of a well-known hosiery firm at Lahore (Punjab), is a Jadavpurian of the decade in question.

Kiron Roy's Oriental Mercantile Co. is mainly a sales organization for electric lamps and other goods. But he was also interested in the manufacturing industries, e.g., the Bengal Lamp Works (Jadavpur). He was a graduate in electrical engineering of the Mass. Inst. of Tech. (M.I. T.), Boston. Another rising manufacturer and businessman is Prafulla Banerjee, partner of H. K. Banerjee & Sons, who, in addition to other items, are managing agents of Kalimpong Electric Supply and Pabna Electric Supply.

As a patriotic worker for the *Alma Mater* Banerjee has made a noteworthy *début*. In the premature death of Kiron Roy (19 October 1945) at the age of 42 India has lost a genuine patriot and a modern-spirited electrical engineer while the N. C. E. and Jadavpur College have been deprived of a constructive enthusiast and a pillar of strength. (See pp. 63-64).

The Chief Engineer of the Bengal Chemical and Pharmaceutical Works is Satis Sen, well known as a Calcutta chemist. One of the biggest electrical contractors in Bengal is Sasanka Bagchi. At the Birla Jute Mills the Chief Engineer is Moni Sen, another well-known figure. Sudhir Chakravarti was for some time an engineer of the Military

Service and is at present the chief figure in the Pioneer Amalgam Coater at Navadwip.

A Jadavpurian of 1924, Ugra Banerjee, Electrical Engineer, has been an independent manufacturer for two years since 1943. But his Eugras Machinery Corporation has already won the estimation of a large number of Electric Lamp Factories, Neon Sign Manufacturers, Thermos-bottle Industry, Radio Valve Works, Vacuum Distillation Works etc. Among the machines manufactured for the first time in India the following are to be credited to Banerjee's pioneering skill and originative enthusiasm: Rotary Oil Vacuum Machine, Continuous Type Coil Winding Machine, Gas or Air Booster, Handflare Machine, Automatic Stem-making Machine, Automatic Filament Spooling Machine, Automatic Wire-glowing Machine and so forth.

To his Jadavpur qualifications Banerjee added those of B.Sc. Hons. (Edinburgh) in 1926. He spent six years in England and the continent coming back to India towards the beginning of 1931 in order to initiate the electric lamp manufacturing industry. For "factorification" abroad he worked for three years as Assistant Electrical Apparatus Designer with George Kent Ltd. at Luton (Bedfordshire). For a year and a half he was an Electrical Machine Tester at Rugby in the firm of British Thomson Houston Co. Banerjee visited some machine factories in Germany, Holland and Switzerland also. At Berlin he came into contact with Bornkesselwerke A.G., at Nijmegen (Holland) with Verenigde Draadfabrieken, and at Aarau (Switzerland) with Maxglo. The Indian industrial world looks upon Banerjee as a machine-manufacturer of mark for the near future.

Like Banerjee many other Jadavpurians of the decade 1920-29 are in for extensive recognition during the next decade. Some of those mentioned above belong to this category. Their careers will deserve an independent treatment.

SECTION 7

Jadavpurians Looking Back

The classes 1920-29 are being placed under the microscope of Jadavpurians trying to look back in an objective manner on their *Alma Mater*, Bengal Technical Institute.

According to a Jadavpurian who is at present the second engineer of the Electric Supply Company in a town of the U.P., the schooling received by him at the College during 1921-25 may be regarded as 100 per cent useful in his present work. But he observes that in those days the students had no acquaintance with engineering stores or with Indian Electricity Act or with Factory Acts. In his business career he has had to make strenuous efforts to grasp the situation.

A Jadavpurian of 1922-25 who, after foreign training, is at present Professor at the College maintains that in his student days there was "absolute disregard in regard to the formation of character." "The Laboratories and Workshops were insufficiently equipped. The teachers were inefficient."

Another foreign-trained Jadavpurian (1921), now a Professor at the College, considers that the schooling in his days (1918-21) may be regarded as having been useful to a certain extent. "But lectures were not delivered on all necessary subjects. Drawing and workshop practice were very poor. No work was done in the Mechanical Laboratory."

A Jadavpurian who owns an electric business in Orissa admits that it is to Jadavpur (1923-27) that he owes his present position and financial success. But he points out that "adequate attention was not paid to practical training in his days and that industrial outings or excursions were rare."

The Works Manager of a Sheet Metal Company (Capital Rs. 500,000) considers that the schooling at Jadavpur (1926-30) has been most useful to him in his business career.

During 1925-28, says an Auto-Signal Maintainer of the

G.I.P.Ry. at Bombay, students were not encouraged enough to read technical magazines and books outside the prescribed texts. "Practical training was not adequate. The N. C. E. schooling helped him to secure his present job." But "it was not very helpful in my practical life," says he, "as my job is a very specialized one in which an educational institution like the N. C. E. cannot give any training."

An American-trained electrical engineer, now in manufacturing as well as sales business as managing and technical director, maintains that the schooling furnished by Bengal Technical Institute during 1921-26 gave him an "opportunity of organizing students for different types of social work." "Self-confidence in organizing any undertaking" was obtained by him in this atmosphere. "This helped me immensely in my present business undertakings," says he.

About the short-comings of that period he observes, "The classes were too large. Pass mark being only 30 per cent., it was easy to pass without learning much. There were few equipments for experimental purpose, and too many boys were grouped together to do one experiment at a time. We needed, besides, more Hostel accommodation for boys and quarters for teachers."

CHAPTER II

The Jadavpur Engineers and Technologists (1930-39)

SECTION 1

*The Jadavpurians of the Third Decade**

For the decade 1930-39 the names and addresses of 270 Jadavpurians were available in 1943. At the moment of writing they may be taken to be about 28-38 years old, in

* Every Jadavpurian referred to in this section is to be taken as belonging to the classes 1930-39.

any case, under forty. Of these only 6 had come back from abroad with foreign qualifications. The occupations and designations of many of the Jadavpurians of the third decade may be gathered from the statement that follows.

1. *Founders-Proprietors-Managers.* Among the Jadavpurians of 1930-39 some two dozen are known to have been registered about 1943 as independent owners of or partners and managers in industrial concerns. Some of these enterprises were located in Assam as Sreenath Mills (Gauhati), Shillong Engineering Works, Excelsior Pioneering Works (Silchar), Bharat Samiti Motor Works (Sylhet), and Standard Chemical Works (Shillong). The names of other concerns of this type, located in Calcutta, are as follows: Machine Parts, Bengal Electric Co., Gopal Hosiery, Faraday Corporation, Nasco, Bharat Battery, Chatterjee Engineering Works, S. K. Mitra & Co., Bharat Musical Hall, Kusum Engineering Works, M. L. Das & Sons, Presidency Engineering Works, Profile Colour Works, and India Cycle Manufacturing Co. Several Jadavpurians were functioning as contractors in Calcutta.

2. *Tata Iron & Steel Co.* Not less than twenty Jadavpurians of the 1930-39 classes were in the service of the Tisco (Jamshedpur) about 1943. Several M.E.'s were employed in the Rolling Mills Department, Energy and Economy Department and Drawing offices. Jadavpurians were chemists in diverse departments. An M.E. was functioning at the Purchasing Office and an E.E. at the Sales Department. There was a Tester in the Testing Laboratory. Several Electrical Engineers were at work in the Power House, the Electrical Department, the Transmission Department and so forth. The designations were draftsman, electrician, technical assistant, lighting inspector, switch board assistant, sub-foreman, and the like.

3. *Machine-Construction and Allied Works.* Prominent

engineering houses like Bird Co. (Indian Patent Stone Co.), Thompson's Workshop, Jessop Co. (Dum-Dum), Indian Copper Corporation (Ghatsila, Bihar), Burn Co. (Howrah), Jay Engineering Works, Bridge Construction (Howrah), Balmer Lawrie & Co., Heatley Gresham Co., Indian Cable Co. (Jamshedpur, Bihar), Mond Nickel Co. (Bombay), Fire Bricks and Potteries Ltd. (Manbhum, Bihar), Britannia Building & Iron Co., Expanded Metal Manufacturing Co. (Howrah), Steel Corporation (Burnpur), J. N. Roy-Chowdhury & Co. (Chittagong), National Iron & Steel Co. (Belur), India Machinery at Dasnagar (Howrah), S. K. Chakravarti Ltd., Pioneer Engineering Co., Indian Iron and Steel Co. (Burdwan), and United Iron and Steel Co. (Belur) drew upon the Jadavpurians of 1930-39 for foremen, engineers, draftsmen, estimators and so forth. Several found employment with the Bengal Electric Lamp Works at Jadavpur. The Gramophone Co. of Dum-Dum, the Steel Products Co. of Kidderpore, the manufacturing department of the College of Engineering (Jadavpur), the Radio Department Philips and others likewise had several Jadavpurians as their foremen or engineers. Nearly four dozen M.E.'s and E.E.'s of Jadavpur 1930-39 were thus accounted for in the machine-construction and allied works of 1943.

4. *Electrical Enterprises.* About a dozen E.E.'s of 1930-39 were functioning outside Bengal about 1943. This was in connection with the Electric Supply at Monghyr (Bihar), Nowgong (Assam), Tezpur (Assam), Darbhanga (Bihar), Sylhet (Assam) and Jamshedpur (Bihar). There was one at Singapore in the Harbour Road Service. In Bengal the Electric Supply Companies of Barisal, Comilla, Bhatpara, Jalpaiguri, Chandpur, Midnapur, Raniganj, Chandernagore and Bankura had Jadavpurians as engineers or superintendents. Jadavpur E.E.'s were engineers likewise with Siemens (India), Diamond Engineering Works, Parsons

Turbine (Martin Co.), Balarampur Power House (U.P.), General Electric Co., Indian Iron and Steel Co. (Burnpur), Oxy-Acetylene Welding Co., Balmer-Lawrie Co., Bengal Electric Lamp Works (Jadavpur), Chowdhury and Agarwalla Co. (Bareilly, U.P.), National Iron & Steel Co. (Belur), the Military Engineering Service of Agra Fort (U.P.), and Albion Engineering Works. Nearly three dozen electrical engineers of Jadavpur (1930-39) were accounted for about 1943 in this way.

5. *Chemical Concerns.* About 1943 the chief chemists of Tata Oil and Ginning Co. at Hapur (Delhi), and Frontier Chemical Works at Rawalpindi were Jadavpurians of 1930-39. Magnolia Dairy Products, Chemical Corporation of India, Bengal Lamp Works, Bihar Miscellany, Bengal Chemical and Pharmaceutical Works, Battery Manufacturing Co., Kartik Bose's Laboratory, Shalimar Paint Works (Howrah), Alkali Chemical Corporation of India, Gouripur Paint Works (Naihati) and other concerns drew upon the Jadavpurians of the same classes for their chemical experts of diverse categories. Nearly two dozen Ch.E.'s found employment in these concerns.

6. *Gun-Manufacture.* Some thirty M.E.'s E.E.'s and Ch.E.'s of Jadavpur 1930-39 were employed in gun-manufacturing about 1943. The Rifle Factory at Ichapur and the Gun-Factory at Cossipore near Calcutta gave employment to them in diverse capacities. They were known as supervisor, electrician, engineer, miller, inspector, chargeman, progress recorder, checker, machine setter, turner, draftsman and so forth.

7. *Aerodrome.* A Jadavpur E.E. of the period in question was in the service of the Aerodrome at Dum-Dum as electrical engineer about 1943.

8. *Railways and Tramways.* An E.E. of 1930-39 was chargeman in the Train Lighting Department at Katihar

(E.B.Ry.) about 1943. About this time Jadavpurians were employed as a draftsman at Kanchrapara (E.B.Ry) and as an electrical engineer at Chittagong (A.B.Ry. Workshop). The chief mechanical engineering estimator at the Railway Workshop of Kharagpur (B.N.Ry.) and the draftsman in the signal department of the E.B.Ry. were Jadavpurians. The Calcutta Tramways had a Jadavpurian as electrical engineer.

9. *Cement Works.* About 1943 a Jadavpur E.E. of 1930-39 was in the service of the Assam-Bengal Cement Factory at Chatak in Sylhet (Assam). An M.E. was at the same time functioning at the Cement Works of Dalmianagar (Bihar).

10. *Petrol.* About 1943 an electrical engineer of Jadavpur 1930-39 was supervisor at Standard Vacuum Oil Co. The head draftsman of the Digboi Oil Co. (Assam) was a Ch.E. The production supervisor at Digboi was likewise a Jadavpurian.

11. *Mining.* Two M.E.'s of 1930-39 were draftsmen at Goa Ore Mines (Singbhum, Bihar) in 1943.

12. *Textile Mills.* About a dozen M.E.'s, E.E.'s and Ch.E.'s of 1930-39 were employed in the textile mills of Bengal about 1943 in diverse capacities. The concerns were known as Basanti Cotton Mills (Panihati), Bharat Jute Mills (Howrah), Banga-luxmi Cotton Mills (Serampore), Prafulla-Chandra Cotton Mills (Khulna), Rampuria Cotton Mills (Hooghly), Premchand Jute Mills (Howrah), Dhakeswari Cotton Mills (Dacca), Sridurga Cotton Mills (Hooghly). The Jadavpurians were functioning as shift engineers, electrical engineers, chemists, etc.

13. *Sugar Mills.* An engineer at the Oudh Sugar Mills about 1943 was a Jadavpurian of this period.

14. *Paper Mills.* About 1943 some chemists at Titagarh Paper Mills and Raniganj Paper Mills were Jadavpurians. Several mechanical draftsmen of the Orient Paper Mills at Brajrajnagar (B.N.Ry.) were M.E.'s of Jadavpur 1930-39.

15. *Printing.* A shift engineer at the Ananda Bazar Patrika Press was a Jadavpurian of the period in question.

16. *Rubber Industry.* The Dunlop Rubber Factory (Hooghly) had about 1943 one mechanical engineer, two chemists and one electrical engineer from among the alumni of Jadavpur 1930-39.

17. *Shoe Industry.* Three Ch.E.'s and three M.E.'s of Jadavpur 1930-39 were in the service of Bata Shoe Co. (Batanagar) as chemists or engineers about 1943.

18. *Tea Estates.* Two Jadavpurians of 1930-39 were known to be employed in tea business about 1943. One was the manager of the Noamuddy Tea Estate at Durrang (Assam) and the other was the mechanical engineer of the Kadambari Tea Estate at Jalpaiguri.

19. *Calcutta Corporation.* In the service of the Calcutta Corporation of this period there were some fifteen Jadavpurians of 1930-39. They were employed at the Palmers Bridge Pumping Station, Ballygunge Drainage Pumping Station and Tala Pumping Station as engineers, as electric inspectors in the Lighting Department, and as shift engineers at the Converter Station and Lighting Sub-Station of the Hogg Market. Besides, the Hydrain Inspector of the Waterworks Department and the Electrical Inspector of the Lighting Department were also Jadavpurians.

20. *Calcutta Telephone Corporation.* A Line Inspector of the Bengal Telephone Company in 1943 was an E.E. of Jadavpur 1930-39.

21. *Calcutta Electric Supply Corporation.* There were four Jadavpurians of 1930-39 in service with the C.E.S.C. about 1943. They were known as inspector, shift engineer, shift supervisor, and meter inspector.

22. *Calcutta Port Trust.* In 1943 a Jadavpurian of

1930-39 was switchboard operator at the Jetty Converter Station.

23. *Film and Cinema.* About 1943 the director of India Movetone was an E.E. of Jadavpur 1930-39. The Aleya Cinema Company had two E.E.'s of the same period. A Jadavpurian was likewise the Sound Engineer of Radha Films. The air conditioning plant of Chitra Theatre was under a Jadavpurian.

24. *Commercial Business.* Oriental Mercantile Company Ltd. had four Jadavpurians of 1930-39 in service about 1943. One of them was an advisory director.

25. *Teaching.* About 1943 Jadavpur College of Engineering and Technology had four instructors and one lecturer from among the Jadavpurians of 1930-39. At this time the Superintendent of the Technical School at Burdwan as well as the instructor of the technical training department of the Ramakrishna Mission Industrial School at Belur were M.E.'s of Jadavpur 1930-39.

26. *Government and Municipal Services.* Jadavpurians 1930-39 were employed about 1943 in the Electric Department of the Bihar P.W.D., the Waterworks of Bombay Municipality and the electric service of the C.P. In Bengal they were stationed as chemists at the Government Test Laboratory and Training Institute, Demonstrator of the Industry Department, Electrical Supervisor of the P.W.D. at Bankura and at Calcutta, Electrical Engineer of the Industry Department, Engineer in Electrical Commissioner's Office, and Foremen of the Telegraph Store Yard at Alipore and of the Government Telegraph Works.

27. *Miscellaneous.* A Jadavpurian of 1930-39 was employed as mechanical engineer at Javakusum Oil Office about 1943. At Jorhat (Assam) the Planters' Music Hall was in charge of an M.E. of the same period.

SECTION 2

*War-Preparedness in the Epoch of Economic Planning
(1933-39)*

The techno-industrial *milieu*, both at home and abroad, of the Jadavpurians of the third decade (1930-39), was on the whole, quite encouraging. The world-economy was getting ready,—somewhat consciously, deliberately and planfully,—for World-War II (Sept. 1939—August 1945). The atmosphere of educational institutions for engineering and technology could not be more favourable. External stimulus was therefore plentiful on the Jadavpur Campus. For India as for the rest of the world the talks of an impending war have been always instrumental in providing families with the urges for technocratic, machinistic, industrial and scientific education.

For certain purposes techno-military preparations are identical with techno-industrial. “*Mistrification*” for boys (training as technicians) and “*nursification*” for girls (training for social work), although economic, professional, social or cultural in character, are essentially military in effectiveness. Every technological institute or engineering college in the two hemispheres is bound to prosper with the expansion of military preparedness and the demand for industrialization.

To be precise, the years 1922-32 witnessed a cataclysmic world-economic depression.¹ But the slump of the crisis was soon followed by a boom no less phenomenal. The period 1933-39 registered a continuous upswing in economic activities. This was manifest virtually in all sectors of agriculture, manufacture and commerce, and in all countries. World-War II (September 1939—August 1945) may be said to

¹ See the chapter on “The World-Crisis in its bearings on the Regions of the Second and the First Industrial Revolutions” in B. K. Sarkar: *Economic Development* Vol. II (Calcutta, 1932), pp. 260-301.

have commenced on the crest of a boom-tide. And it served but to magnify, intensify and universalize the boom.

The depression involved in December 1930 an unemployment of 642,000 in Italy, 1,854,000 in the United Kingdom, 4,895,000 in Germany and 6,000,000 in the U.S.A. By 1933 the British unemployment figure rose upto 2,521,000 and the American to 12,000,000. The recovery or counter-depression or anti-unemployment measures in every country took more or less the same pattern. In one word, they began to be called planning or planification in economy. The period 1933-39 was the epoch *par excellence* of economic planning in the world-economy. Planification or planned economy became a fashionable category of economic, political and social thought about this time on account of the success of Gosplan I. (1928-32) or the first state-plan in Soviet Russia. All the countries without exception took to state-planning in every form: *étatisme*, intervention, control, direction, protection, subsidy. The Hitler-state with its national-socialist (Nazi) economy, legally established in 1933, started its *Vierjahresplan* (four-year plan) with comprehensive control or *étatisme*. The same year the National Industrial Recovery Act was passed in the U.S.A. and became the nucleus of Roosevelt's "New Deal." This, again, was but control-economy, carried to the n^{th} term, within the limitations of the Federal Constitution.² England did not care to coin a new term adapted to state-planning. But *étatisme*, control, protection, subsidy, autarchy, and what not were fully embodied as much in the Coal Mines Acts of 1929-32 and the Agricultural Marketing Acts of 1931-33 as

2 *The New Monetary System of the United States* (National Industrial Conference Board, New York, 1934); Folks: "Making Relief Respectable" (*Annals of the American Academy of Political and Social Science*, Philadelphia, November 1934), H. Ickes: "The Planning of Public Works in the U. S. A." (*International Labour Review* Geneva, 1937).

in the Ottawa Agreement and Imperial Preference of 1932. In December 1938 it was therefore possible for Donald Tyerman to observe in his "Strength of Democracy" published in the *Lloyd's Bank Monthly* that in practice democracy had proved to be no less state-minded than dictatorship.

The Italian economist, Ernesto d'Albergo, was equally acceptable when he maintained in his *La Politica finanziaria dei grandi Stati dal dopoguerra ad oggi* (Financial Policy of the Great Powers from the End of the War to the Present Time, Milan, 1939) that state-intervention was a universal fact in Italy, Germany, the U.S.A., England and France. Indeed Mussolini's Fascism was in Italy but an expression of this universal *digvijaya* (world-conquest) of socialism. The replacement of *laissez faire* by socialism was likewise the predominant feature of French finance and economic system from 1919 to 1939. State control of industry was started by Poincaré in 1926. Potash, fertilizer and petroleum were the first items in war-preparedness to be attacked by *étatisme*. Banks and shipping companies were helped with state credit during the crisis of 1929-32. The grants amounted to 3,000,000,000 francs. The etatistic planning became systematized under the *Front Populaire* (1936-37) of Blum. This comprehensive socialism embraced the nationalization of armaments industry, coal-mining and railways, the cartellization of the aircraft industry, wheat control through the *Office National Professionnel du Blé*, the centralization of electric concerns, and the state credits to the tune of 6,000,000,000 francs for diverse public works (1938-42).³

Be it observed that planning spelt automatically socialism. The "bourgeois" countries like Germany, England, and the U.S.A. did not go beyond socialism in these endeavours

³ G. Peel: *The Economic Policy of France* (London 1937), pp. 223-224, 226. Exchange: £1=70-90 francs (1933), 124 francs (1937), 171 francs (1938), 200 francs (December 1944, liberated France).

calculated to combat unemployment and promote economic recovery. These plannings were thus fundamentally different from the planning in Soviet Russia. There state-control went beyond ordinary control or *étatisme*. The Sovietic economy was that of abolition of private capital, private profit and private savings. The total capital resources of the people were concentrated in the State. The planning was communistic or state-capitalistic.

Economic recovery, industrialization, autarchy, nay, simply, job-finding or campaign against unemployment were the innocent expressions prevalent during the period of planned economy throughout the world, Sovietic or communistic as well as non-Sovietic or bourgeois-socialistic. But invariably and directly as well as indirectly the technoeconomic development involved in planning was but camouflage or euphemism for military-naval-air-preparations. The period 1933-39 was an epoch of war-preparedness in every country. All the preliminaries of World-War II (1939 Sept.—1945 Aug.) are to be seen in the economic planning as much of Soviet Russia as of the bourgeois countries.

One instance may be cited. The *Front Populaire* of Blum was professedly a peace-party. But as Peel observes in the *Economic Policy of France* (London 1937), the most costly rearmament programme was embarked upon by France during this regime (1936-37). The Blum ministry made provision for nearly 9,000,000,000 francs in addition to the amounts obtained from the Extraordinary Budget for national defence. This was but the climax of everything that the French economy had been attempting as preparation for war since 1928, the year of the stabilization of the *Banque de France* on new foundations.

Neither in France nor elsewhere was industrialization, electrification, Colonial Development Act, road-planning, *bonifica integrale* (comprehensive land-reclamation), *battaglia*

del grano (wheat campaign), Imperial Preference, autarchy or the like a simple measure of economic prosperity or financial stability. Techno-economic security or self-sufficiency was but a handmaid to and the foundation of as well as preparation for techno-military power. Comparative war-preparedness was then the fundamental factor in the comparative technocracy and industrialism of the "great powers" during the decade 1930-39. The war-finance and war-effort for World-War II made their *début* during the world-economic depression in the measures calculated to counteract it.

The world-economy was goalfully advancing towards techno-military conflicts and decisions. The war-ward industrialization and technocratization of the great powers did not fail to have their impacts on the Indian economy, and therefore, on technical, industrial and scientific studies.

In the techno-economic war-preparedness of Germany a leading role was played by the Raw Materials Office. Its function was to render Germany independent of foreign imports in regard to raw materials. The *Schaffendes Volk* (Creative People) Exhibition was opened by Göring at Düsseldorf in 1937 in order to demonstrate the new raw materials "manufactured" by German metallurgists, chemists and engineers in the laboratories and workshops. Raw materials were exhibited as the "creations" of man and not as the gifts of Nature. The synthetic production of raw materials from Germany's unlimited supply of coal, salt, wood, water and air was her epoch-making achievement on the eve of World-War II. Loeb, the head of the raw material supplies department, was in a position to predict that Germany would be able to dispense with foreign motor spirit by 1940. It is the scientific discoveries and technocratic inventions that constituted in a powerful measure the foundations of the German Empire, ephemeral although, from the Atlantic to the Valley of the Volga and from the

Arctic Ocean to the deserts of North Africa (1939-43). Today the world knows also that the atom bomb which was used by the U.S. at Hiroshima and Nagasaki in August 1945 had its beginnings in the pre-1939 laboratories and workshops of Germany.

The geographical conditions and the limitation of natural resources compelled Germany to depend very substantially on techno-economic inventions, *Ersatz-produkte* (substitutes), synthetics etc. for war-preparedness. The British Empire is, on the contrary, world-wide and rich in varied resources. The war-preparations of England assumed therefore another pattern of techno-economic armament. To use the well-known terms of agricultural science, she could afford to employ the "extensive" methods of cultivation, so to say, in her industrialization and technocratic readjustments. Germany, on the other hand, had to take recourse to "intensive" methods, *i.e.*, make the most effective and economic use of the few resources that she possessed.

By the Anglo-German standard of technocracy and industrialism, again, both Soviet Russia and Japan were relatively backward. The war-preparedness of both took the shape, therefore, more of general industrialization than of British specialization in certain lines of industry or German specialization in inventions, discoveries, creation of raw materials, or manufacture of substitutes. The interest of both Soviet Russia and Japan in general industrialization involved in each country the promotion of industries for investment, *i.e.*, capital or production goods (*Produktionsmittel*) at break-neck speed. This entailed some sacrifice to the supply of *biens de consommation*, *i.e.*, consumption goods. The techno-industrial difference between England, Germany, Soviet Russia and Japan are to be understood in the main as but relative differences.

From 1929 to 1937 the relative position of investment

goods and consumption goods in Soviet Russia and Japan moved as follows (in index numbers):⁴

Year	Soviet-Russia		Japan	
	I.	C.	I.	C.
1929	100	100	x	x
1930	142	121	100	100
1931	183	141	91	100
1932	213	156	104	106
1933	235	165	134	118
1934	292	189	168	128
1935	368	224	195	139
1936	486	286	218	142
1937	x	x	264	154

The index of investment goods rose steadily in Soviet Russia from 100 in 1929 to 486 in 1936, that of consumption goods also rose upto 286. But the former was invariably higher than the latter. In Japan the story was the same down to 1937, with the exception of the two years 1930 and 1931 when the investment goods index was lower than the consumption goods index.⁵

It is questionable if Indian publicists, businessmen, educators and economists were capable of grasping the morphological distinctions between the diverse types of industrial-technocratic structure developed in those countries getting ready for a world-war. But the sum-total of all these war-preparednesses abroad,—however varied in pattern,—had one uniform effect on the Indian socio-cultural

⁴ *Annuaire Statistique de la Société des Nations 1937-38* (Geneva 1938), Table 110, p. 177. For relative decline in agricultural output as well as relative expansion in non-agricultural see Clark: *A Critique of Russian Statistics* (London 1939) p. 49, 68.

⁵ See the section on "Investment Goods vs. Consumption Goods" in B. K. Sarkar: *The Equations of World-Economy* (Calcutta 1943), pp. 170-174. cf. A Baykov: "Development of Industrial Production in the U. S. S. R." (*Economica*, London, February 1941).

and economico-political *milieu*. They consisted in the heightening of urges for more science, more technocracy, more "mistrification" and more industrialization in schools and colleges.

SECTION 3

Techno-Economic India on the Eve of World-War II. (1938-39)

Indian economy was in tune with the world-economy in regard to the techno-industrial upswing. India's expansion in the diverse sectors of mining and manufacturing activity was sympathetically responding to the techno-military boom manifestations of the "great powers." On the eve of World-War II (Sept 1939-Aug. 1945) economic India found herself like the rest of the world, consciously or unconsciously, on the crest of an industrial boom curve.

The following table⁶ exhibits some of the industries in their output at 1938-39 *vis-à-vis* 1935-36:

I. Iron and Steel manufactures (in

		1938-39	1935-36
1. Pig Iron	...	1,576,000	1,541,000
2. Iron Castings	...	88,000	76,000
3. Steel Ingots	...	977,000	880,000
4. Semis (Blooms, Billets, Slabs, Tin Bars, Sheet Bars, Sleeper Bars)	...	791,000	71,000
5. Finished Steel (Rails, Beams, Bars, Channels, Angles, Tees, Fish- plates, Steel Sleepers, Plates, Black Sheets, Galvanized Sheets, Tin Plates,* Wires,* Wire- nails,* etc.)	...	726,000	606,000

⁶ Adapted from *Statistical Abstract for British India 1929-39* (Delhi, 1941); pp. 523, 527, 529, 531, 533, 575-579, 580-584.

*For these items the figures for 1934-37 are not available.

		1938-39	1935-36
II.	Petrol (in gallons)	... 19,820,000	17,243,000
III.	Kerosene Oil (in gallons)	... 38,731,000	33,014,000
IV.	Portland Cement (in tons)	... 1,170,000	781,000
			(in 1937-38) (in 1934-35)
V.	Paints (in cwts.) ...	577,000	539,000
			(1937-38)
VI.	Heavy Chemicals (in cwts.)		
1.	Hydrochloric Acid (non-fuming) ...	7,200	7,000
2.	Nitric Acid (non-fuming) ...	12,000	10,000
		g) 512,000	(1937-38)
4.	Alum ...	35,000	56,000
5.	Aluminium Sulphate ...	90,000	116,000
6.	Ammonium Sulphate (Neutral, in tons) ...	15,000	14,000
7.	Ferrous Sulphate (in cwts.) ...	12,000	13,000
8.	Magnesium Sulphate (in cwts.) ...	70,000	61,000
9.	Sodium Sulphate (in cwts.) ...	17,000	20,000
			(1937-38)
VII.	Jute Manufactures		
1.	Twist and Yarn (in tons) ...	55,000	44,000
2.	Canvas, Gunny Bags, Gunny Cloth, Rope, Twine etc. (in tons) ...	1,221,000	950,000
VIII.	Paper (White, Coloured, Writing, Manilla, Packing, Bamami, Pulp Boards, Blotting etc. (in cwts.) ...	1,184,000	892,000
IX.	Cotton Mills Production		
1.	Yarn (in lbs.) ...	1,304,000	1,056,000
2.	Woven Goods (in lbs.) ...	921,000,000	797,000,000
3.	Grey and Coloured goods other than piecegoods (in doz.) ...	1,426,000	1,291,000

		1938-39	1935-36
	4. Hosiery (in doz.)	... 2,414,000	1,440,000
X. Minerals			
1. Mica (in cwts.)	... 123,000 (1938)	59,000 (1935)	
2. Manganese (in tons)	... 968,000 (1938)	644,000 (1935)	
3. Iron Ore (in tons)	... 2,744,000 (1938)	2,364,000 (1935)	
4. Chromite (in tons)	... 44,000 (1938)	39,000 (1935)	
5. Coal (in tons)	... 28,343,000 (1938)	23,000,000 (1935)	

With one or two exceptions the production trend from 1935 to 1939 was invariably a rising one. It served to furnish a stimulus to families of intellectuals in regard to the demand for technical, scientific and industrial education. The "drives" for "mistrification" were growing from more to more.

In spite of the increase in the industrial output India's position was very low by the world standard. The comparative position of the great industrial powers like Germany, the U.S.A., the U.K., France and Russia for 1937-38 was examined in regard to 23 articles by Wagemann in the Journal of the *Institut für Konjunkturforschung* (Berlin, June 29, 1939). A few articles like coal, pig iron, steel ingots and cement are being singled out in order to have India tested by the "industrial giants." In the following table Indian figures and Wagemann's figures are being placed together for comparison (in 000 tons):

Countries	Coal	Pig Iron	Steel	Cement
Germany	186,179	18,044	22,661	12,605
U. S. A.	352,326	19,468	28,285	19,814
U. K.	231,874	6,871	10,560	7,417
France	46,501	6,049	6,174	4,272
Soviet Russia	132,900	14,992	18,447	5,605
India	28,343	1,576	977	1,170

The above table indicates that even in absolute figures India on the eve of World-War II was virtually nowhere as an industrial producer in the perspective of Germany, U.S.A., U.K., France and Soviet Russia. And yet the figures of Wagemann as well as those about India have no reference to the values *per capita*. In relative statistics as deduced by calculation per head of population India would come much lower than she appears to be in absolute figures.⁷

SECTION 4

Jadavpur College Visavis the Engineering Colleges of the U.S.A. (1939)

The decade 1930-39 was as fruitful in the number of passes at Jadavpur College as the previous decade. The results of the annual examinations of the final year are tabulated below :

Year	M. E.	E. E.	Ch. E.	Primary Tech.	Survey & draftsman- ship	Agri- culture	Total
1930	...	11	16	6	12	5	50
1931	...	21	32	5	18	7	83
1932	...	16	18	3	9	8	54
1933	...	7	15	5	9	16	52
1934	...	10	17	3	23	12	65
1935	...	27	21	9	15	5	77
1936	...	26	30	13	22	10	101
1937	...	11	22	10	20	14	82
1938	...	18	26	7	11	10	79
1939	...	22	16	8	9	12	68
Total	...	169	213	.69	148	99	13
							711

7 B. K. Sarkar : *The Equations of World-Economy* (Calcutta 1943), Section on "The Ranking of Germany as an Industrial Adult," pp. 72-81.

The engineers (mechanical, electrical and chemical) totalled 451 (as against 368 during 1920-29). In agriculture the first batch came out in 1937. It is necessary to observe that while the number of electrical engineers remained virtually identical, 213 as against 215, that of mechanical engineers rose upto 169 from the previous 117. Altogether, the total passes in all the six branches were counted at 711, much above the 572 of 1920-29.

The output of engineers was 45 p.a. during this decade, the annual output during the previous being 37. Perhaps the impacts of the industrialization-trend and the coming World-War II have to be noticed in this progress of Jadavpur as manifest in the rise of annual average.

The number of students on the rolls from 1930 to 1939 was as follows :

Year	No.	Year	No.
1930	490	1935	511
1931	668	1936	512
1932	581	1937	512
1933	622	1938	769
1934	554	1939	779

The annual average for the decade was about 600 (584 during 1920-29). For the first quinquennium,—the period of depression,—the trend was haphazard. But during the second quinquennium (1935-39) the decline remained at first steady for three years until there was an abrupt rise in 1938 which was kept up during the next year. The shadows of the approaching war appear already to have been cast. In any case, the figures 769 and 779 for 1938 and 1939 exceeded the peak of 1924 by 69—79. The demand for mechanical, electrical and chemical engineering among Bengali intelligentsia was steadily on the increase. Jadavpur College was satisfying a genuine and growing need.

Higher technical education as provided by the diverse Governments throughout India in 1938-39 exhibited the following pattern :⁸

Categories of Institutions	Number of Institutions	Scholars
1. Engineering Colleges	7	2,413
2. Technology Colleges	2	150
	<hr/>	<hr/>
	9	2,563

There were then some 2,600 students in colleges of engineering or technology in All-India on the eve of World-War II.

The foregoing statement excludes Jadavpur College, which provided, as it did, for 779 scholars. The number of engineers passed out in 1938-39 of all the Engineering Colleges in entire India (excluding Jadavpur) is indicated below :⁹

1. Bachelors of Electrical Engineering	...	129
2. " Civil " "	...	133
3. " Mechanical " "	...	35
4. " Mining and Metallurgy " "	...	29
	<hr/>	<hr/>
	Total	326

The All-India total of passes was 326. Jadavpur with 46 furnished 14 per cent of the Bachelors in Engineering.

Bengal Engineering College at Shibpur,—a Government institution,—had on its rolls the following number of students from 1931 to 1939 :¹⁰

Year	Students
1931-32	... 193
1936-37	... 178
1937-38	... 197
1938-39	... 206

8 *Statistical Abstract for British India 1929-39* (Delhi 1941) p. 125.

9 *Statistical Abstract 1929-39*, p. 14.

10 *Statistical Abstract 1929-39*, p. 138.

The average for the three years 1936-39 was 170. The Jadavpur average for the same three years was 686. In numerical strength Jadavpur College was four times Shibpur College.

The graduates turned out of Shibpur were numbered as follows :

Year			No
1926-27	...	...	27
1931-32	...	...	46
1936-37	...	...	48
1937-38	...	...	48
1938-39	...	...	34

The average for the three years (1936-39) was 43. The Jadavpur average for the same period was 46. The total for Jadavpur and Shibpur was 89, i.e., 27 per cent of the All-India total (326).

For technical education of the lower grade, i.e. for schools we get the following picture for All-India in 1938-39 :¹¹

Categories of Institutions		Number of Institutions	Scholars
1. Engineering and Surveying Schools	...	10	1,858
2. Technical and Industrial Schools	...	580	34,246
Total	...	590	36,098

The figure 36,000 for an entire subcontinent of nearly 380,000,000 inhabitants is, to say the least, unspeakable. This is an index, however, to the kind of man-power that India possessed on the eve of World-War II.

Between 1862 and 1940 the number of Engineering Colleges of the Jadavpur or Shibpur standard in the U.S.A.

11 *Statistical Abstract 1929-39*, p. 126.

rose from 6 to over 150.¹² Technological and engineering instruction was of course offered by all the State Universities. Private Universities of the highest standing like Columbia (New York) and Harvard (Cambridge, Mass) were also prominent in this branch of educational endeavour.

Besides, a number of institutions were exclusively consecrated to engineering and technological education. Some of these specialized institutions are mentioned below :

1. Arman Institute of Technology, Chicago (with courses in chemical, civil, electrical, and mechanical engineering). Students enrolled : 1469. Instructors : 101.
2. Polytechnic Institute, Brooklyn (N.Y.), (chemical, civil, electrical and mechanical). Students : 2938. Instructors : 167.
3. California Institute of Technology, Pasadena (aeronautical, chemical, civil, electrical and mechanical engineering). Students : 862. Instructors : 124.
4. Carnegie Institute of Technology, Pittsburg (chemical, civil, electrical, industrial management, mechanical, and metallurgical engineering). Students : 2375, Instructors : 246.
5. Case School of Applied Science, Cleveland (Ohio) (chemical, civil, electrical, mechanical and metallurgical engineering). Students : 992. Instructors : 101.
6. Colorado School of Mines, Golden (Geological, metallurgical, mining, petroleum engineering). Students : 883. Instructors : 74.
7. Cooper Union Institute of Technology, N.Y. (civil, electrical, and mechanical engineering).
8. Drexel Institute of Technology, Philadelphia (chemical, civil, electrical and mechanical engineering). Students : 1956. Instructors : 119.

¹² *American Universities and Colleges* ed. by C. S. Marsh (Washington D. C. 1940), pp. 109-115.

9. Georgia School of Technology, Atlanta (aeronautical, chemical, civil, electrical and mechanical engineering). Students: 1603. Instructors: 95.
10. Kansas State College of Agriculture and Applied Science, Manhattan (agricultural, architectural, civil, electrical and mechanical engineering). Students: 4205. Instructors: 419.
11. Massachusetts Institute of Technology, Boston (aeronautical, building, chemical, civil, electrical, electro-chemical, general, industrial, mechanical, metallurgical, naval architecture, marine engineering, public health and sanitary engineering). Students: 3093. Instructors: 393.
12. Michigan College of Mining and Technology, Houghton (civil, electrical, mechanical, metallurgical and mining engineering). Students: 802. Instructors: 73.
13. Missouri School of Mines and Metallurgy (ceramic, civil, electrical, metallurgical and mining engineering). Students: 809. Instructors: 70.
14. Montana School of Mines, Butte (geological, metallurgical and mining engineering). Students: 372. Instructors: 24.
15. New Mexico State College of Agriculture and Mechanic Arts, State College (civil, electrical and mechanical engineering). Students: 1310. Instructors: 82.
16. Newark College of Engineering, New Jersey (civil, electrical and mechanical engineering). Students: 870. Instructors: 85.
17. North Carolina State College of Agriculture and Engineering, Raleigh (ceramic, civil, electrical and mechanical engineering). Students: 2297. Instructors: 184.

18. Oklahoma Agricultural and Mechanical College; Stillwater (civil, electrical, industrial and mechanical engineering). Students : 6185. Instructors : 309.
19. Pratt Institute, New York (electrical and mechanical engineering).
20. Rensselaer Polytechnic Institute, Troy (N.Y.) (aeronautical, chemical, civil, electrical, industrial, mechanical and metallurgical engineering). Students : 1488. Instructors : 134.
21. Rose Polytechnic Institute, Terra Haute (civil, electrical and mechanical engineering). Students : 250. Instructors : 27.
22. South Dakota State College of Agriculture and Mechanic Arts, Brookings (civil, electrical, metallurgical, and mining engineering). Students : 1294, Instructors : 116.
23. Stevens Institute of Technology, Hoboken (N.J.) (general engineering). Students 868. Instructors : 68.
24. Texas Agricultural and Mechanical College, College Station (civil, electrical, mechanical, and petroleum engineering). Students : 5862. Instructors : 287.
25. Texas Technological College, Lubbock (civil, electrical, and mechanical engineering). Students : 3896. Instructors : 175.
26. Thomas Clarkson College of Technology, Potsdam (N.Y.) (chemical, civil, electrical and mechanical engineering). Students : 527. Instructors : 38.
27. Utah State Agricultural College, Logan (civil engineering). Students : 3229. Instructors : 148.
28. Virginia Polytechnic Institute, Blacksburg (civil, electrical and mechanical engineering). Students : 2780. Instructors : 207.
29. Worcester Polytechnic Institute (Mass) (civil, elec-

trical, and mechanical engineering). Students: 690. Instructors. 73.

It is worth while to note, as an item of engineering pedagogics, that at California Institute of Technology the number of students per instructor was as low as 7, at M.I.T. 8 and at Worcester 9.5. Perhaps 10 may be regarded as the norm for highest efficiency in teaching according to American conceptions.

In 1939 the number of engineering students in 137 Engineering Colleges of the U.S.A. was as tabulated below:

I. Undergraduate	... 101,914 (including 11,423 evening students).
II. Post-Graduate	... 5,547
Total	... 107,461

We may recall here the All-India Government figure 2563 plus 779 (Jadavpur), i.e., 3342.

At the State Universities engineering courses were no less encyclopaedic than in the specialized Engineering Colleges or Institutes. The State University of Michigan, for instance, offered instruction in aeronautical, chemical, civil, electrical, mechanical, metallurgical, naval architecture, and transportation engineering to 2153 students. Similarly there were 1857 students at the College of Engineering of the State University of Illinois which offered courses in architectural, ceramic, chemical, civil, railway, civil, electrical, railway, electrical, mechanical, railway mechanical, metallurgical and mining engineering.

Incidentally be it observed that the financial position of each one of these Technological and other Universities is inconceivably high by the Indian standard. The hundreds of millions of dollars need not be specified for the time being. But the authorities of the N. C. E. as well as the Alumni Association have need to know that many of these

American Engineering Colleges (or business magnates associated with them) are in a position to offer one or two fellowships *p. a.* to Jadavpur College. On the strength of such scholarships it may be possible for several members of the Jadavpur teaching *personnel* to get schooled and factorified in the U.S.A. for two years each.

From the financial viewpoint the decade 1930-39 was a "normal" decade for Jadavpur College. That is, the expenditure on capital items (construction and equipment, nay, library) was virtually nil. In ten years it did not go beyond Rs. 24,000. The total expenditure (comprising the capital) then was as follows :

<i>Year</i>	<i>Expenditure</i>	<i>Year</i>	<i>Expenditure</i>
1930	... 188,000	1935	... 207,000
1931	... 208,000	1936	... 231,000
1932	... 172,000	1937	... 209,000
1933	... 293,000	1938	... 213,000
1934	... 163,000	1939	... 211,000

Total for the decade : Rs. 2,095,000

We get a total expenditure of Rs. 2,095,000 for the ten years 1930-39. The annual average, therefore, was Rs. 209,500. The average number of students for the decade was 585. The *per capita* expenditure per annum, then, amounted to Rs. 358. This may be considered to be the norm of educational expenditure at Jadavpur on the eve of World-War II.

SECTION 5

Some Rising Engineers and Technologists

The chemical engineers of the classes 1930-39 are at present in the 27-37 age-group. And yet it is possible to

single out some of them as having won distinction as employees or as independent industrialists. Gaur Dhar of Titagarh Paper Mills is well known as a factory chemist and is an expert in paper manufacture. His classmate, Manoranjan Datta, is in Government service as a publicity officer for chemical industries. In the villages of Bengal he has been doing solid educational work among soap makers, tanners, etc.

A comrade of theirs is Pratul Ghosh who is working with the Tara Oil and Ginning Co. at Hapur (Delhi). He is established as an oil expert and has made a name by supplying dehydrated vegetables for the Army during the war. Bata Shoe Co. has Sasanka Seal in the higher rungs of chemical service. Seal's work in the chemical laboratory is of considerable value. Bibhuti Chakravarti is an expert in the manufacture of jelly, canned fruits, groundnut butter, etc. and has been supplier to the Army.

As an expert in the manufacture of soaps and perfumeries and a designer of machineries Nilratan Kar is no less mentionable than Nirmal Sen-Gupta, who, as an employee of the Chemical Corporation of India (Suren Roy) is experienced in the manufacture of chemicals and designs of furnaces. Two of the most prominent industrial chemists of Bengal are Ratan Datta (equipped with German experience), manager and director of Nasco, the biggest soap factory, and Sachin Saha, manufacturer of batteries for Bharat Battery Co. Tarini Paul has had all-Indian experience as designer and erector of chemical plants (U.P., Punjab, Hyderabad). Sachin Datta is a colleague of Kiran Roy on the Oriental Mercantile Co. and is well-known for his skill in business organization. At the Bengal Chemical and Pharmaceutical Works Abani Bose's work as laboratory chemist is well appreciated. The Punjabi Jadavpurian, Banarsilal Anand, was for some time Head Draftsman of the Digboi Oil Co. in

Assam and is at present employed as a high-post chemist in a chemical factory in the Punjab. As a Chief Chemist of Tata Iron and Steel Co. Kumar Bose is experienced in the manufacture of basic chemicals such as sulphuric acid, sodium carbonate, sodium hydrate, etc. The chief chemist of the Health Institute of Calcutta, Narayan Mukerjee, is a successful manufacturer of patent medicines.

At Shillong the Standard Chemical Co. is being run by Ranjit Das, who has taken the cue from his father, the American-trained pharmacologist Premananda Das, one of the veteran Jadavpurians of the first quinquennium (1906-10). At Ichapur Promode Ghosh has acquired experience in the manufacture of guns. Gaur Saha is the consulting Chemical Engineer of Vanaspati Industries Ltd. of Ghaziabad near Delhi, and is an expert in the manufacture of vegetable ghee, caustic soda, and chlorine. His skill in the design, construction and erection of chemical plants is being drawn upon by interested parties. Bijan Datta, the proprietor of Profile Colour Works at Jadavpur, has succeeded in manufacturing Blue Print Ink which filled a real need during the war. Bhabesh Das-Gupta (1939) is manufacturer of varnishes, phenyl etc. in connection with International Chemical Industries Co.

To the class of 1930 belong the engineers, Kshirode Bose of Machine Parts & Co., Balai Bose of Calcutta Electric Lamp Works, and Bhagavan Barman of Diamond Engineering Co. All the three enjoy a reputation as manufacturers of machineries and electrical goods. Broti Majumdar (1936) does mainly job work in connection with India Metal Products Co.

Other mechanical and electrical engineers of the classes 1930-39 have likewise been becoming prominent. In responsible position are to be found Jagadish Bagchi, Chief Engineer of Dalmia Paper Mills, Phani Banerjee, Resident

Engineer of Midnapur Electric Supply Co., Arabinda Brahamachari, Shift Engineer, Calcutta Electric Supply Corporation, Kali Jha, Chief Engineer, Electric Supply of Durbhanga (Bihar), and Brahmananda Das-Gupta, Sub-Divisional Officer, Central P.W.D.—all belonging to the Class of 1933. Deb Chatterjee is Executive Officer in the Office of the Deputy Chief Controller of Imports, Nil Ratan Banerjee and Sachi Chatterjee Foremen in Government Post and Telegraph Workshop, and Amiya Chatterjee, Electric Inspector to the Government of Bengal (now on study leave in the U.S.A.). Man Kumar Ghosh is one of those who, as Electrical Engineer in Metal and Steel Factory at Ichapur, has been able to give a good record of Jadavpur College as an institution for the training of competent men.

Two Mechanical Engineers of the Class 1936, Prabhat Roy and Sanat Tarafdar, have after their experiences with Bata for a number of years established in 1944 the Panel Pin Manufacturing Co. Ltd. They are producing panel pins, gimp pins, tacks, brads, dowel nails etc., both of brass and steel. The machines for these manufacturers have been designed by their *guru* in *mistrification*, the American-trained Professor Sudhir Chakravarti.

As proprietor of Presidency Engineering Works, Punyavant Bothra (1938) has already acquired some name. At the National Iron and Steel Co. of Belur Ajeyasree Chatterjee is Designer and Draftsman and is held in esteem. Laxmi Das is the general manager of M. L. Das & Sons in the sheet metal line. He has been active in the organization of Brass and Copper Utensils Industries Association. It has already rendered good service to this particular industry and trade. Keshab Bose, the proprietor of Kusum Engineering Works, is establishing his reputation as the manufacturer of electrical pottery machine.

Amarendra Nath (1939) is getting known as manufacturer

of electric kettle, irons and brackets. He has established Nath's Brackets as a Company on a proprietary basis. At the Jay Engineering Works Sukumar Deb, as Engineer, has been acquitting himself creditably.

It is worth noting that the names of not more than seven or eight foreign-schooled and foreign-factoried Jadavpurians of the classes 1930-39 are available, as against 28 of the classes 1910-19 and 29 of the classes 1920-29.

SECTION 6

Jadavpur as Seen by Jadavpurians

A Jadavpurian of 1933, who is at present the proprietor of a small printing press and a publisher of Bengali books complains that as a student he found the "number of up-to-date machineries, instruments and appliances insufficient for the purpose of teaching." "Practical work was very inadequate." Besides, "the basic principles and desires of the N. C. E. were not fulfilled," says he.

A Mechanical Engineer, who went through the full five-year course from 1933 to 1938, found over-crowding in the batches set up for laboratory or practical work. "Individual attention could not be paid by the teacher. The number of instruments or tools available was too small for the group." Besides, he felt the Workshop practice as provided in a college programme was not enough for the engineering profession. He would have liked to obtain chances for working as an apprentice in a manufacturing establishment while he was at college.

A Jadavpurian of the Class 1938, who has joined his father's sheet metal works as manager, writes to say that it is because of the schooling at Jadavpur that he has been able to manufacture machines for the use of his factory. His father also is convinced that an ordinary *mistri* could not do

the machine-work in the line of repairs, modifications, and construction—such as his son, the Jadavpur M.E., has been doing. The mechanism of tools and implements as well as the processes of manufacturing things have come to this Jadavpurian from College education. "My ability to make sheet rolling machines, wire-rolling machines as well as wire drawing machines I owe to the N. C. E.," says he: "College education is required to train ordinary *mistris* up to this kind of constructions, modifications and repairs."

CHAPTER III

The Jadavpur Engineers and Technologists 1940-45

SECTION 1

*The Jadavpurians of World-War II**

The addresses of only 74 Jadavpurians of the classes 1940-45 were available. But the six years (1940-45) were the most propitious for engineers and technologists. Both as independent industrialists or contractors and employees in one or other sector of war effort Jadavpurians had a prosperous time. Nobody was unemployed or under-employed. And yet it is curious that so few as 74 addresses should be known to the office of the Alumni Association even down to 1945. The list is very incomplete since the total number of passes during this six-year period was 695. Be this as it may, it is only necessary to add that these engineers and technologists were between 23 and 27. They were the juniormost conceivable and must therefore have to be seen in the lower rungs of the industrial employment ladder.

1. *Founders-Managers-Proprietors.* One Jadavpurian of 1940-45 was functioning independently as an industrial

* Every Jadavpurian referred to in this chapter is to be taken as belonging to the classes 1940-45.

chemist. Another of the same period was active as a contractor.

2. *Tata Iron and Steel Co.* Four E.E.'s and four M.E.'s were in the service of the Tisco.

3. *Machine Construction and Allied Works.* Jadavpur M.E.'s were in service with B. N. Elias & Co., Bengal Electric Works, Metal Steel Factory (Ichapur) and Eastern Engineering Co. An Assistant Foreman of Expanded Metal Manufacturing Co. at Lilooah, a Foreman of Steel Products at Kidderpore, and an Engineer of Aryan Engineering Works were Jadavpurians. The United Iron & Steel Co., Burn Co., Jay Engineering Works, Ramkrishna Iron Works, Tatanagar Iron Foundry, and George Henderson & Co. got some of their Engineers from the youngest M.E.'s of Jadavpur.

4. *Electrical Enterprises.* Two electrical draftsmen were employed in the Electrical Commissioner's Office. The Superintendent of the Power House at Panchkote (Bihar) was a Jadavpurian. Babcock Wilcox's Head-draftsman likewise was a Jadavpurian. The Electric Supply Companies at Muttra (U.P.) and Bhatpara obtained their Engineers from Jadavpur. An Electric Engineer of Jadavpur was in the service of Reyrole & Co. The Officer in charge W/S M.E.S. at Ranchi was a Jadavpurian.

5. *Chemical Concerns.* A Mechanical Engineer of Jadavpur was an employee of the Murapur Paint Works at Sodepur. George Henderson Co. found employment for a Chemical Engineer with themselves.

6. *Gun Factories.* Quite a number of Jadavpurians were in the Gun Factories at Cossipore and Ichapur in diverse capacities. A common designation was Supervisor or Progress Reporter. At the New Ordnance Factory of Lucknow also Jadavpurians of this period were in service.

7. *Tramways.* An Electrical Engineer of the Calcutta Tramways Co. was a Jadavpurian.

8. *Paper Mills.* A Mechanical Engineer and an Electrical Engineer of Jadavpur were employed in Orient Paper Mills.

9. *Teaching.* A Jadavpur M.E. was Instructor at the Industrial School of the Ramakrishna Math at Belur. Another M.E. was employed in the Scientific and Industrial Research Department of Delhi. Several M.E.'s and E.E.'s became Instructors at Jadavpur College.

10. *Government and Municipal Services.* A Mechanical Engineer of Jadavpur was in the Drawing Department of the Government Test House at Alipur. Several were Assistant Foremen in the Government Telegraph Store Yard and Post and Telegraph Works. An Assistant Foreman of His Majesty's Mint was a Jadavpurian. The Public Works Department of Calcutta had a Jadavpurian as Engineer. The Electrical Superintendent of Central P.W.D. at Jharsaguda (B.N.Ry.) was a Jadavpurian.

11. *A.E.I.* Two Jadavpurians of this period were employed with the Associated Electric Industries (British Concern).

12. *Army.* In the service of the Eastern Army at Patna a Jadavpur Engineer was functioning.

13. *A.R.P.* A Jadavpurian was in the service of the Air Raid Protection.

SECTION 2

The British and German War-Efforts (1939-45)

The *milieu* of the Engineering College at Jadavpur as elsewhere in India, nay, in the rest of the two hemispheres

was quickened into life by World-War II (1939-45). It is to warfare,—and not simply to war-preparedness,—that inventors and discoverers look for a great, if not the greatest stimulus. Technocracy and industrialism as well as science and research can have no more powerful allies than actual war operations. The most flourishing condition for colleges of engineering and technology is by all means then furnished by war-ecology.

In the United Kingdom, thoroughly industrialized as it is in peace time, war effort implied chiefly the diversion of industrial activity to certain special channels or rather the intensification and expansion of these channels. The output of coal declined from 231,300,000 tons in 1939 to 194,500,000 tons in 1943, that of pig iron from 7,970,000 t. in 1939 to 7,187,000 t. in 1943, and of cotton yarn from 487,000 t. in 1939 to 312,000 t. in 1943. The output of steel ingots and castings remained more or less steady during the period 1939-43 at nearly 13,000,000 t. It is in aluminium that there was a rise from 25,000 t. in 1939 to 56,000 t. in 1943. The increase was noticeable likewise in the construction of new merchant vessels. In 1940 the net tonnage completed was 810,000 t. It was 1,204,000 t. in 1943. Agricultural output likewise was invariably in the ascendant. Wheat output rose from 1,645,000 t. in 1939 to 3,449,000 t. in 1943 barley output from 892,000 t. to 1,641,000 t., oats from 2,003,000 t. to 3,059,000 t., potatoes from 5,216,000 t. to 9,822,000 t., and sugar beet from 3,529,000 t. to 3,760,000¹. For the first time the U.K. experienced "full employment." Unemployment came down from 1,305,000 in 1939 to 85,000 in 1944. Among the new industrial activities of five years (1939-44) were to be noticed 100,000 planes, 6,000 naval vessels, and 6,750,000 tons of merchant marine,

4,000,000 machine guns, 8,000,000,000 rounds of small ammunition and 35,000 artillery and anti-aircraft guns. We are not attempting a comprehensive and exhaustive summary of the British war-effort as announced in November 1944.

To these snapshots of British war-economy may be added a bird's eye view of Germany's war-effort².

Long term industrial bills were guaranteed and rendered discountable on the eve of the war by the *Deutsche Industrie Bank*, a state-controlled institution. Another state bank, the *Oeffa*, financed public works, guaranteed 95% of the values of the bills and rendered them rediscountable. The aeroplane industry was financed by the *Luftfahrtkontor* (Aeroplane-Bank). In November 1941 a Board was established to increase the output of fruits and vegetables. One of the golden rules in Ley's system of rationalization ran to the effect that two should do the work of three. Children from 10 upwards were subject to conscription for agricultural work. Everybody was subject to conscription for harvest work.

In 15,000 Diesel and Petrol Engines oil was substituted by another power, viz. gas. Agricultural tractors used gas. Lorries also used gas made from peat, lignite, coal, but no wood. Edible oils were extracted from the flowers of tobacco plants. Oil cakes became bye-products. Rayon was extracted from coal, water and air. This new "hollow fibre" was as warm as wool. Poplars were yielding 16 times as much textile fibres, and reeds 30 times as much as cotton. In order to help farmers to instal electricity in their homes and improve their implements subsidies were granted so as to cover 10-60% of the cost. In 1941 inland waterways took 20% more traffic than in 1940. The railway ton-milege was likewise 32% more. The construction of railway trucks in 1941 was double

² H. W. Singer: "The German War Economy" in the *Economic Journal* (London), June-Sept. 1942, pp. 194, 201.

that of the previous year, that of railway engines 65% more. In February 1942 a Board was established to increase the output of cattle products. In September 1942 the actual expenditure on food was not greater than in 1938.³ Nearly 4,000,000 mothers and children were provided with 450,000,000 doses of vitamin free of charge.

Techno-scientific improvements enabled the reduction of railway coach from 50 tons to 15 tons. Metals were being saved thereby considerably. The saving of metals was likewise effected by the reduction of metal contents of canning tins and combined containers from 26 ounces to 12 ounces. Thomas steel was improved by new processes upto full equivalence with Siemens-Martin steel. Compulsory standardization was enforced in the industrial work. Types were drastically reduced, e.g., in glass bottles from several thousand to 91, in pocket knives from 600 to 6, scythes from 8,000 to 6, in sewing machines from 13 to 2 and in steel beds from 50 to 1. Not more than 2 kinds of tractors were permitted to be manufactured. Substitutes for eggs were invented, known as milkegg, syntova, etc. They were equivalent to 800,000,000 eggs p.a. The basic material was skimmed milk.

Larger firms consuming more than 5,000 tons of coal were compelled to employ a steel-saving engineer and a fuel-saving engineer. In 1942 the clothing industry output of 1938 was produced with 66% workers.⁴ The munitions output in 1943 was 6.3 times higher (in weight) than in 1941 with only 50% more labour. In 1943 wheat harvest was to the tune of 4,200,000 tons (as against 2,300,000 tons in 1918) and barley harvest 2,600,000 tons (1,100,000 tons in 1918). The consumption of green vegetables was 124% more in calories than in the pre-war dietary.

³ Royal Economic Society (London) Memorandum, March, 1943, p. 22. *Economic Journal*, London, April, 1943 pp. 125, 128, 132, 133, 135.

⁴ *Economic Journal* (London), June-Sept. 1944, p. 207, December 1943, p. 371, Royal Economic Society Memorandum, July 1944, p. 22.

The "managerial revolution" consisting in the control of industry by technical experts was introduced in 1944 by the appointment of "labour engineers". In every establishment employing over 300 workingmen labour-engineers had to be appointed. They were to watch that technical *personnel* was not misused in administrative jobs or as liaison officers to the authorities⁵.

These are specimens of war-industrialization, war-technocracy and war-employment from hyper-industrialized countries like England and Germany. They point to changes in the direction of techno-industrial enterprise and *par excellence* to researches, inventions and discoveries. The pattern of war-economy in India was of course different in kind as well as modest in quantity and variety. Let us look to that picture.

SECTION 3

"Inflated Employment" and "Overproduction" of the War-Economy in India (1939-45)

The war-effort of India can be seen from the figure for 1943 in comparison with that for 1939. An important index of progress in industrialization and technocracy during World-War II is furnished by the volume of employment. The global figures for All-India (excluding Indian States) are being given below for four years 1943, 1939, 1935 and 1923⁶:

Categories	1943	1939	1935	1923
I. Government and				
Local Fund Factories	355,400	132,450	114,700	108,200
II. All Other Factories	2,081,400	1,618,700	1,406,000	1,214,300
Total Employment				
in Industries	2,436,800	1,751,150	1,520,700	1,322,500

5 *Economic Journal* (London), June-September, 1944, p. 206.

6 *Statistical Summary of the Social and Economic Trends in India* (Delhi, 1945), pp. 5, 15-17.

The total industrial employment in 1943 was 2,435,000 as against 1,751,000 in 1939. The steady expansion from the figure for 1935, and of course, for 1923, is obvious. War-economy was but a continuation of the peace-economy. The continuation was by all means maintained on an intensified scale. The increase in employment during sixteen years from 1923 to 1939 was to the tune of 428,000, i.e., something above 32 percent. But that during the first four years of the six-year war (1939-45) was counted by 686,000 hands. This was an increment of over 39 percent. Evidently the industrial boom was conspicuous.

The progress in industrialization and techno-industrial boom induced by the war may be seen, in the figures of some of the industries covered in the above statement, as follows:

Categories	1943	1939	1935	1923
Textile Industry	1,002,000	817,000	729,000	661,000
Engineering	254,000	148,000	128,000	157,000
Minerals & Metals	93,000	55,000	44,000	48,000
Chemicals, Dyes	84,000	58,000	51,000	29,000
Paper & Printing	61,000	44,000	33,000	25,000
Wood, Stones,				
Glass	83,000	52,000	33,000	23,000
Hides & Skins	34,000	13,000	8,000	6,000

The expansion of employment in each sector of industry during the war period over the position in 1939 was phenomenal. It was considerably above the normal and general trend of progress since 1923. There was indeed what may be called an “inflation” in industrial employment. Corresponding to the inflation in currency and prices war-economy was essentially an economy of inflated, i.e., much beyond the normally expected, volume of employment. It is the custom or fashion now-a-days to describe this kind of inflated employment as “full” employment. Strictly speaking, economically we ought to call it over-employment, as distinguished from unemployment, under-employ-

ment, and normal or natural employment. In the course of normal economy, i.e., the non-war or post-war economy, the economy of demobilization and reconstruction economists should by all means expect some doses of dismissal, retrenchment and unemployment in quite a number of industrial sectors. The regime of inflated employment during World-War II can but be followed in due course by a regime of deflation in employment as in currency and prices, and automatically of all-round depression involving disemployment (*disoccupazione*, in Italian) and unemployment.

We need not detain ourselves on this economic analysis of the war-effort in industry, technocracy and employment. The boom in Indian economic activities from 1939 to 1943 is self-evident.

Some of the other expansions of industrialization and technocracy during the war-period may be seen in the following statement, describing certain items of industrial production :

Items	1940-41	1938-39	1932-33
I. Iron and Steel (in 000 tons)			
1. Pig Iron	1,959	1,575	880
2. Steel Ingots	1,258	977	591
3. Finished Steel	925	726	359
II. Heavy Chemicals			
1. Sulphuric Acid (in 000 cwts)	778	512	484
2. Sulphate of Ammonia (in 000 tons)	28	15	18
III. Cement (in 000 tons)	2,183	1,512	593
	(1942-43)		
IV. Sugar (in 000 cwts.)	23,149	13,360	6,778

	Items	1940-41	1938-39	1932-33
V.	Paper (in 000 cwts)	1,821 (1942-43)	1,184	804
VI.	Jute Manufac- tures (in 000 tons)	1,247 (1942-43)	1,221	903
VII.	Cotton Manufac- tures (in million lbs.)			
1.	Piecegoods	1,185 (1943-44)	920	367 (1920-21)
2.	Yarn	1,660 (1943-44)	1,303	660 (1920-21)
VIII.	Power Consump- tion (in million units)			
1.	Commercial small light and power (for offices and otherwise)	109.7 (1941-42)	91.6	
2.	Industrial Power	1,603.8	1,194.2	
3.	Electric Rail- ways	110.9 (1941-42)	14.2	
4.	Total Energy sold	2,586.2 (1943-44)	1,681.8	

In the above table the constant year is 1938-39, the pre-war years vary from 1920 to 1932, and the war-years from 1940 to 1944. All the same, the continuity of the expansion-trend in industrial production comprising power consumption is patent. The output in many of these

sectors of industry was manifesting perhaps the signs of inflation or inflated production. The *Review of the Trade of India 1940-41* (Delhi, p. 53) went so far as to suspect an "overproduction" in coal when the output was 29 million tons. In 1939-40 overproduction was suspected in sugar as the output was 1,241,700 tons. Cement was under the same suspicion in 1940-41 when the output was 2,800,000 tons, and paper with no more than 1,753,000 cwts as output (*Ibid*, 57, 63, 67).

The scope of our study does not lead us, for the time being, to analyze the economics of inflated production or over-production. It goes without saying that the atmosphere of overproduction as that of over-employment furnishes tremendous spurs to engineering enterprises and engineers. The impact on colleges like the one at Jadavpur during the war-regime was substantial and effective.

The inflation of industrialism in India during the war period is well reflected in the trends of export-import between 1939 and 1945. During 1938-39 manufactures constituted 30 per cent of exports. They rose to 54 per cent in 1944-45. On the other hand, raw materials constituted 46 per cent of exports in the pre-war year. During 1944-45 the percentage came down to 22. In the import trade of India the percentage of manufactures was 62 in 1938-39. It came down to 32 in 1944-45. And raw materials which accounted for only 22 per cent of imports constituted 59 per cent in 1944-45.

Techno-industrial researches were not entirely unknown in war-time India. In April 1940 were established the Board of Scientific and Industrial Research as well as the Council of Scientific and Industrial Research. The financial grant from the Government of India was Rs. 500,000 per annum. Over 200 research problems were undertaken.

In Germany, U.S.A. and England plastic materials

were made of synthetic resins. But the raw materials required for many of these resins could not be produced in India in any appreciable quantity. So indigenous resources from which plastics could be produced were investigated, says Shantisarup Bhatnagar. Jettison tanks and petrol-proof plastic containers were prepared out of jute and shellac. Bagasse plastics were developed for the fabrication of building materials. Horn-waste plastics were worked out for electrical appliances. Collapsible tubes were made from castor oil and tailor wastes. Enamels, lacquers, varnishes and plastics were developed out of *bhilawan* or markingnut. The development of vegetable oil lubricants and internal combustion engine fuels out of the vegetable oils marked another step in the utilization of the country's resources for various industrial needs.

In the fields of drugs granular products were prepared from slaughter-house wastes. Various vegetable dyes were extracted from the country's forest wealth. Among other products of the laboratories may be mentioned high tension ignition cable testing device, slushing varnishes for petrol storage metal tanks, patching cement for the repair of rubber tanks, petrol-proof hose pipes, petrol containers, smoke candles, distress signals, etc. The researches related also to the production of synthetic fibres from oil-seed cakes, chemo-therapeutic products from *nim*, *brahmi*, etc. semi-synthetic tanning materials, rubber from other plant sources and so on⁷.

The foundation stone of the Government of India's Central Glass and Ceramic Research Institute was laid at Jadavpur near Jadavpur College of Engineering by Ardeshir Dalal on 24 December, 1943.

7 This statement is adapted from Shanti Bhatnagar's Report on “Scientific Achievements during the War” published in the *Hindusthan Standard* (Calcutta) 21 August 1945.

SECTION 4

The War-Ecology of Jadavpur College

The techno-industrial boom of World-War II was reflected at Jadavpur College in the enormous swelling of the examination-passes. The results for the years 1940-45 are exhibited below in six different branches. (See Appendix A, I).

Year	M.E.	E E.	Ch.E.	Junior Tech.	Survey	Agri- culture	Total	
1940	...	15	23	5	19	21	7	90
1941	...	18	38	11	24	12	3	106
1942	...	22	34	9	27	14	2	108
1943	...	27	44	11	30	17	1	130
1944	...	43	33	9	19	14	1	119
1945	...	82	24	14	18	3	1	142
Total	...	207	196	59	137	81	15	695

In six years the total number of engineers equipped with the hall-mark of Jadavpur in three denominations (M.E., E.E. and Ch.E.) was 462. This was 11 more than the total of the previous ten years. An "over-production" (?) of engineers might then be easily suspected by those who had been watching the "normal" trend of the developments since 1906. For this six-year period the average output of engineers was 77 p.a. (as against 45 of the decade 1930-39 and 37 of the decade 1920-29). The steep rise in the curve of the average during World-War II was by all means liable to interpretation as "inflation" in engineer-output. Anxieties as to the maintenance of this level of production in engineers during post-war years were not illegitimate and unnatural. Be this as it may, the total passes in all the six branches amounted to 695 in six years. This is to be

placed against 711 of the decade 1930-39 and 572 of the decade 1920-29. The war-ecology was abundantly in evidence.

The war-ecology was no less patent in the numerical strength of the College. The number of students on the rolls from 1940 to 1945 is exhibited below :

Year	No.	Year	No.
1940	... 1021	1943	... 1268
1941	... 1245	1944	... 1158
1942	... 1251	1945	... 1250

The demand for education in mechanical, electrical and chemical engineering was in keeping with the expanded demand in other lines of socio-economic activity. The phenomenal expansion of the rolls of Jadavpur College was organically connected with the inflationary manifestations of the war-boom along the most diverse fronts of industrial and commercial development.

In the above statement of totals we have included the Junior Technical, Survey as well as Agriculture Departments. If we remove them and confine our attention exclusively to the three Higher Engineering Courses (M.E., E.E., and Ch.E.) the number of students from 1939-40 to 1945-46 would be as follows : 717, 835, 737, 797, 842, 763, and 797. The average of this seven-year period was 784. (See Appendix A, III).

It is not possible to get the exact figure for the scholars in the Indian Engineering Colleges of the Jadavpur standard for the war-period. So far as scholars in Technical and Industrial "Schools" are concerned, their number was 39,000 in 1940-41, as against 34,000 (in 1938-39) already referred to in a previous context. The expansion was not conspicuous in the perspective of the up-till-then growth but

kept up the increasing trend. The following table indicates the curve from 1920 to 1941 (in 000 scholars)¹ :

Year	No.	Year	No.
1920-21	... 10	1936-37	... 31
1924-25	... 20	1938-39	... 34
1928-29	... 27	1939-40	... 38
1932-33	... 26	1940-41	... 39

The statement shows progress in twenty years to the tune of nearly four times. We understand, at any rate, that the situation at the start in 1920 was too poor and unspeakable.

A direct contribution of Jadavpur College to the war-effort of India consists in the provision of training for war-technicians or *mistris* for military and civilian industries. A special department was instituted in April 1941 with 16 electrician trainees. Courses for training blacksmiths, fitters, turners and carpenters were introduced. The trainees were directly selected by the National Service Labour Tribunal. Down to 1944 altogether 159 trainees passed the test examination held by the Government. Stipends were paid by Government to non-matriculates at the rate of Rs. 26 per month and to matriculates at Rs. 31 p.m. The salaries of the special instructors were likewise paid by Government. Most of the tools and machineries also were supplied by Government. On Dec. 31, 1944 the number of trainees was 74. The war-ecology did not fail in this manner to enrich Jadavpur College with the *mistrification* of the socio-pedagogic atmosphere.

Be it mentioned that by April 1943 there were 54 training centres in Bengal with 5802 technicians as trainees. Throughout India there were 384 centres and the total

¹ *Stat. Summary of the Social & Economic Trends in India* (Delhi, 1945), p. 3.

number of technicians under training was 41,368.² It would not be irrelevant to record in this context another item of the war-ecology as exhibited in the technician (*mistris*) training movement. Some 500 Indian *mistris* having three-year workshop experience were sent out to England for training under Bevin's directions for a period of six months. Returning to India with British factory and labour experience, these "Bevin boys," although small in number, served to propagate among Indian intellectuals, businessmen and industrialists the need for *mistrification* (training of technicians or *mistris*) throughout the length and breadth of the country.

Even during World-War II the finances of Jadavpur College were not note-worthy except during the last two years, 1944 and 1945, which brought a little wind-fall. Construction and equipment as items of expenditure were hardly talked of in 1940, 1941, and 1942. The total expenditure for the quinquennium (1940-44) comprising all items is listed below :

<i>Year</i>	<i>Expenditure</i>		
1940	Rs. 230,000
1941	„ 274,000
1942	„ 304,000
1943	„ 481,000
1944	„ 640,000
Total	„ 1,929,000

The five-year total was Rs. 1,929,000 yielding the annual average as Rs. 385,800. Excluding the capital expenditure (construction and equipment) which amounted to Rs. 129,000, the total was Rs. 1,800,000. The annual

2 G. W. Tyson: *India Arms for Victory* (Allahabad 1944) pp. 234-335.

average was Rs. 360,000. The annual average of students (1940-44) was 1188. The *per capita* expenditure per annum, then, was Rs. 303 (without capital expenditure) or Rs. 324 (with capital expenditure).

In Soviet Russia under the three Five-Year Plans (1928-1942) the *Technicums* turned out nearly 1,000,000 scholars. Of these over 800,000 were trained for industry, transport, farming and general economic work. During the Russo-German War (1941-43) the number of *Technicum* scholars was 450,000.³

The development of secondary technical education since the retreat of Germany can be exhibited in the number of *Technicums* as follows: 1943: 974; 1944: 1421; 1945 (summer): 1585. These *Technicums* are schools for industry, transport, agriculture and general economy. In 1945 there were 1300 secondary schools (not described as *Technicums*) for medicine, law, pedagogics, theatre, art and so forth. There were then 2885 secondary schools for the industries and professions.

The progress since 1914 is obvious. At that time the number was 295. It rose to 1055 by 1928 and 2100 by 1938 and 3730 by 1941. Evidently during the Russo-German war of 1941-43 a large number of *Technicums* ceased to exist.

The German word *Technikum* was used in Czarist Russia as *Technicum* to describe Secondary Technical Schools which may be likened approximately to the *Fachschulen* (Subjects-Schools) of Germany. Soviet Russia has not removed that word. In 1944 there were nearly 1180,000 students in the *Technicums* of Soviet Russia, says Semenjen Plotkin, Chief of the Technical Education Board at Moscow. For 1945 the contingent was 205,000. New *Technicums*

³ S. Plotkin: "Technical Secondary Education in Russia" (*Hindusthan Standard*, Calcutta, 21 October 1945).

were being opened in accordance with the requirements of the Five-Year Plan introduced in 1944 along with the retreat of Germany from the Russian soil. A Special Board of Technical Education was set up in 1943 by the Committee on Higher School Affairs. That may be regarded as, the starting point of the post-war developments.

It goes without saying that Indians today can hardly think of emulating Soviet Russia as any other great power. They are *ultima thules* to Young India. All the same, there is no reason why Indian exponents of education for engineering, technocracy, *mistrification* and economic modernization should not make regular pilgrimage to Soviet Russia as to Japan, Germany, the U.S.A., England, France, Italy, and elsewhere. A first-hand study of Russian educational, techno-industrial, scientific and research institutions by such Indian scholars and publicists as can speak and use the Russian language for the purposes of investigation and research is a supreme cultural necessity for the Indian *intelligentsia*.

SECTION 5

The Youngest Lions Among Jadavpurians

The Jadavpur engineers and technologists of World-War II (1939-45) are 22-28 years old,—all younger than 30. In this epoch of techno-industrial boom, inflation and over-employment virtually every one of them is occupied in some sector of war or semi-war industry. It is naturally too early to speculate about or forecast their future careers. Very many of them have started well. A few of those who have already been showing some marks of merit in practical life are being signalized here as the juniormost or youngest lions among Jadavpurians.

Savanta Das-Gupta is in the Research Department of the Central Government at Delhi. In the Military Engineers

Service at Fort William Calcutta Deb Ghosh and Rebati Roy-Chowdhury have a place worth mentioning. Bhudeb Das manufactures radio parts at Das Radio Products, and Amitabha Roy pumps and electric fans. Electric fans and fittings are likewise manufactured by Radha Shyam Kapoor and Radha Ballav Kapoor. Amiya Roy of Diana Engineering Works is getting established.

The chemical engineer, Kashinath Banerjee, has inherited his father Kishori Banerjee's organizing ability and is managing the monthly journal, *Industry*, and other techno-economic publications with credit. As a chemist of George Henderson & Co. Bimal Ghosh manufactures bags as containers of food materials for use in war-time. The material utilized is ordinary gunny bags which are treated with bitumin, paper, etc. Murari Dawn manufactures flunol (boiler compound) and other chemicals.

Barun Banerjee has been working in the Dalmia Cement factory and Sudhakar Barman in the Indian Iron and Steel Co. of Burnpur. Nalini Mukherjee is an Instructor of Jadavpur College and has proceeded to England with a Government scholarship.

Rabi sen is employed in Bangaluxmi Soap Works. Sushil Kundu is a chemist with the Batas, and Kishori Chatterjee with the Tatas.

Kshirod Roy-Chowdhury (1945) is the chemist of the Murahar Paint Works. At the Jay Engineering Works Nalini Sen is engaged in the extraction of oil from nuts for aeroplane plant.

SECTION 6

The Shortcomings of Jadavpur

A Jadavpurian,—M.E. of the Class 1940,—now an employee in the Government Munitions Works,—complains

that "no particular care was taken in regard to students of ordinary merit or low calibre." "Practical difficulties were not solved." On the other hand, "there was no method of recognizing exceptional merit." "No encouragement or reward was offered for skill in design or the handling of machines," says he.

Down to 1940, say many members of the Alumni Association, the National Council of Education was administered by lawyers and solicitors. The place of industrialists or businessmen was not in evidence. Even in 1944 compulsory factory training for the students was not a question of practical politics. The administrators failed to actively co-operate with manufacturers and commercial people.

An Instructor in Electrical Engineering at Jadavpur, who is proceeding to England as India Government scholar for communication-engineering, observes that in his student days (1939-43) there was no close touch between the students and the teaching staff in academic matters. He suggests the introduction of seminar or tutorial classes in the final years. "Laboratory work, especially in communication-engineering, was far from sufficient. Laboratories were over-crowded and inadequately equipped. The want of charts, diagrams and epidiascope demonstrations was keenly felt during lectures."

One of the oldest alumni of the N. C. E., at present well known as a social worker of public importance, believes that there has been some improvement in the administration of the College during the last few years. A mentionable feature of today according to this observer is the establishment of connections with other centres of education and practical training in India and abroad. Attempts are being made, says he, to make the public actively interested in the affairs of the N. C. E. and Jadavpur College.

"The College has become very big," says one of the oldest alumni (1907-10) who is a Professor after several years

of studies in foreign countries (U.S.A. and Germany). He thinks that "students come here now not from any spirit of idealism but mainly to learn a profession in order to earn their livelihood." Under the present administration "teachers too are becoming mere wage-earners", says he, "they feel now less for the College than their predecessors used to do. The College, as it is being run, may turn out good engineers and mechanics but not good citizens." This observation should appear to be rather unfactual in view of the solid work done by Jadavpurians, especially by the Alumni Association for their *Alma Mater*. However, he regrets that practically no new equipments have been added (except in the Workshop) during the last fifteen years. The moral is obvious.

One of the oldest alumni of the National Council of Education, who later had training in physics in the U.S.A., and has kept touch with the developments at Jadavpur, feels that "the spirit of adaptation is almost absent now among most of the professors and the executive authorities." He believes that "the education has become stereotyped, perfect on paper and from the academic point of view." Moreover, he suggests that there prevails a "complacency to the effect that we have almost achieved our goal." It seems that this view, pessimistic as it is, may be as unrealistic as the previous one. But in any case such observations ought to be given their due. Among other things he wants the professors to "keep themselves in intimate touch with the present-day Indian problems such as are in any way related to technical education."

In every decade Jadavpur has had shortcomings. It is evident also that never have the shortcomings been overlooked. Perhaps during certain periods the executive authorities have felt helpless before the mountain of difficulties. The absence of initiative among them may often have been a fact.

PART V

*The Academic Interests and Social Experiences of the
Jadavpur Teaching Staff*

CHAPTER I

The Activities of the Teaching Corps.

Members of the teaching corps at Jadavpur College are not by the terms of their appointment required to carry on researches in engineering, technology and science. The financial resources are too poor, be it observed at once, to permit engineering and allied researches under the auspices of the N.C.E. This is a limitation and a shortcoming to which attention ought to be drawn in any case.

Be it remarked, however, that, all the same, some of the professors do take part in investigations of an industrial or commercial and scientific character and are responsible for publications in engineering, scientific, economic or other journals and books. Their participation in engineering, scientific, economic and allied Conferences is also to be noted. A few have contacts with the Universities, Institutes and Public Bodies as examiner, adviser, expert or otherwise. Some of them, again, are regular members of scientific, engineering, economic, social and other Academies, Associations or Clubs.

A few teachers belong to the directorate of joint stock companies or function as consulting engineers. But it is necessary to note that no full-time member of the teaching personnel is permitted by regulations of the N.C.E. to be professionally connected with a business firm in a money-earning capacity except with the special sanction of the authorities. Since 1941, besides, the rule for every full-time teacher has been daily attendance for not less than seven periods at class, laboratory, workshop or library.

Some of the members of the teaching staff are well connected with the social events, theatricals, music recitals,

sports and athletics etc. of the Campus. Sudhir Chakravarti (M.E.), Hem Guha (E.E.), Prabhat Roy (Chemistry) and Bimal Chanda (Chemistry) are in frequent demand from the Physical Culture Department of Baneswar Sarkar and Jahar Paul. As an organizer of the youth movement Naresh Sen (Physics) has an all-Bengal name. Jagat Paul (Mathematics) is a social worker of importance in the district of his birth.

Several teachers are examiners of candidates for the Calcutta University examinations. They are Hiralal Roy (Chemistry), Purna Biswas (Physics), Naresh Sen (Physics), Satis Chakravarti (Mathematics), Amar Pramanik (Mathematics), Shiva Sen (History), and Shiva Deb (Geology).

Bibhuti Chakravarti (Chemistry) who lectures on food technology is an organizer of manufacturing concerns. Jellies, ground-nut butter, *chutney* (pickles), malt and so forth are the different lines in which he has served the Army during World-War II.

The self-sacrificing activities of Professor Gopal Banerjee of the Chemistry Department in opening a free canteen for destitutes during the famine of 1943 are well-known to the inhabitants of the Jadavpur Colony. Co-operation came to him not only from students but from colleagues like Professors Sudhir Chakravarti, Gopal Sen, Deben Chakravarti, Satis Bhattacharya, Prabhat Roy and others.

It is not to be understood that every social, academic, research or literary activity of every member of the teaching staff is known to all the students or even to all the colleagues of the same Department. A thing like this cannot be expected in any University or Institute of the world. The activities of some Jadavpur teachers have not failed, however, to exert palpable influence on the industrial, economic, social and scientific circles outside the Jadavpur Campus,—in Calcutta and beyond. The N.C.E. and the Alumni Association ought to see to it that the social, scientific and research work on the

part of Jadavpur teachers can expand in quantity, variety and quality in the near future.

CHAPTER II

In Mathematics

Professor Satis Chakravarti, M.A. has been known in the mathematical world for a quarter of a century on account of his original investigations in Algebra including Determinants, Continued Fractions and Calculus of Higher Differences. More than two dozen papers by him have been published in scientific journals. The review of his papers also has appeared in some well-known scientific Reference-journals. His papers have attracted the notice of eminent mathematicians like Sir Thomas Muir, F.R.S., and Professors W. H. Metzler (New-York), F. Cajori (California), H. Bohr (Copenhagen, Denmark) and T. Hayashi (Tohoku, Japan). He is the author of a Text-Book on Co-ordinate Geometry.

The first paper of Chakravarti's was published in the *Bulletin of the Calcutta Mathematical Society* for 1920-21. In the *Mathematical Journal* of Tohoku (Japan) his paper on "A Factorial Continuant and a Recurrent" was published in 1930. In 1941 his paper "on a few Recurrents" was published in the *Journal of the Indian Mathematical Society*.

Chakravarti's contacts with the Indian Science Congress commenced at the Calcutta Sessions in 1928. Subsequently he has attended or sent papers to the sessions of 1930 (Allahabad), 1937 (Hyderabad), 1939 (Lahore), 1940 (Madras), 1941 (Benares), 1942 (Baroda), 1944 (Delhi), and 1945 (Nagpur).

The following is a list of original papers by Chakravarti :

1. On the Transformation of a General Determinant into a Continuant and a Recurrent and a New Method of Solving Simultaneous Equations. (*Bul. Cal. Math. Soc.* Vol. 12, 1920-21).
2. On the Evaluation of some Factorable Continuants (*Ibid.* Vol. 13, 1922-23).
3. On the Evaluation of some Factorable Continuants, Part II (*Ibid.* Vol. 14, 1923-24).
4. On a Factorable Continuant (*Ibid.* Vol. 14, 1923-24).
5. On Two Pairs of Factorable Continuants (*Ibid.* Vol. 15, 1924-25).
6. On the Evaluation of a Factorable Continuant of Muir (*Ibid.* Vol. 17, 1926).
7. On Factorable Continuants (Published in 1927).
8. A Note on a Factorable Continuant (*Proc. Ind. Sc. Congress* 1928).
9. On a Factorable Determinant with four Contiguous Diagonals (*Ibid.*, 1930).
10. A Factorable Recurrent whose roots are all arbitrary (*Ibid.*, 1930).
11. A Factorable Continuant and a Recurrent (*Tohoku. Math. Journ.* Vol. 32, 1930).
12. Some Algebraic Identities and a New Method of Solving Linear Simultaneous Equations (*Journal of the College of Engineering and Technology*, Jadavpur, 1932).
13. On a Few Factorable Continuants and a Theorem in Determinants (*Ind. Phys. Math. Journ.* Vol. 14, No. 2 1933).
14. On a Few Algebraic Identities (*Bul. Cal. Math. Soc.*, Vol. 23, 1936).

15. On a Pair of Factorable Recurrents (*Proc. Ind. Sc. Cong.* 1937).
16. An Algebraic Identity and a Unit Recurrent (*Ibid*, 1939).
17. An Identity of Higher Differences (*Proc. Ind. Sc. Cong.* 1940).
18. On a Factorable Determinant (*Ibid*, 1940).
19. On Some Algebraic Relations (*Ibid*, 1940).
20. On a special Recurrent (*Ibid*, 1941).
21. On a Few Recurrents (*Journ. Ind. Math. Soc.* Vol. I, 1941).
22. Some Identities (*Proc. Ind. Sc. Cong.* 1942).
23. An Algebraic Relation of Higher Differences (*Ibid*, 1942).
24. An Algebraic Identity and a Determinant (*Ibid*, 1942).
25. Some Further Algebraic Identities (*Journ. Ind. Math. Soc.* Vol. 8, Nos. 3 & 4, 1944).
26. An Algebraic Identity and Determinant (*Ibid*, 1945).
27. On an identity of higher differences and a Factorable Recurrent (*Ibid*, 1945).

A text-book for Intermediate and Engineering students of Mechanics has come out from the pen of Assistant Professor Amiya Bose (1941-42). It deals with the *Dynamics of Particles* in Vol. I and with *Statics* in Vol. II Part I. According to Principal Deva Ghosh of Carmichael College, Rangpur, the book is lucidly written and illustrated with a variety of examples calculated to throw light on the principles of the subject. Special emphasis has been laid on the graphical aspect of mechanical problems.

Assistant Professor Jagat Paul, one of the oldest alumni as well as teachers, has had business experience in several lines. Hill Tipperah Tea Co., and Bengal Modern Tea Co., Assam-Ceylon Tea Co., Harishnagar Tea Estate (Tipperah State), and Lahariganj Tea Estate (Assam) are some of the concerns to which he has devoted his organizing ability. He

was also one of the founders of the Techno-Chemical Laboratory Ltd. (Calcutta).

In connection with *Tripura Hitasadhini Sabha* (Tipperah Welfare Society), *Bangadeshiya Kayastha Samaj* (the caste organization of Bengali Kayasthas) and Assam-Bengal Distress Relief Committee Paul has worked off and on as Secretary or other Executive.

Among Paul's publications may be noted *Jatiya Shiksha* (National Education) and *Parimiti Shiksha* (Mensuration). He has prepared the final manuscripts for *College Algebra*, *Trigonometry*, and *Mensuration* for Engineering students.

CHAPTER III

In Mechanical and Electrical Engineering

The *Tech* 1943 describes Professor Satis Bhattacharya of the Mechanical Engineering Department as follows : "Dr. Bhattacharya delivers his lectures with such supreme and calm self-confidence that it appears as if he is just giving us the tiniest bit of his gigantic knowledge. Actually he has plenty of safety factors in class and no one has ever seen him stick at a design problem, be it tough or not. We are no judges of his knowledge and that we shall not try to be."

In the *Tech* 1944 Bhattacharya is exhibited in the following manner : "Through mirth and jokes he makes the intricate theories of Applied Mechanics simple and the jumbled assembly of machine-tools vivid. The class of Hydraulic Machines runs at the highest efficiency and his clear conception of machine design provides strong foundation for the budding engineers. In short, whatever he touches he turns into gold. Such is our master-brain,—unique and incomparable."

After graduation with M.Sc. from Calcutta University Bhattacharya took A.M.M.E. and A.M.E.E. of Jadavpur. In Germany he obtained the Doctorate of Engineering (Dr. Ing.) at the *Technische Hochschule* (Technological University) of Berlin-Charlottenburg in 1925.

For several years Professor Jatin Bose has been examiner of candidates for mechanical engineering at the Kala-bhavan Technical Institute of Baroda. He was on the National Planning Committee's subcommittees, e.g., the one on Fuel and Power, and the other on Engineering Industries, and attended three sittings at Jamshedpur and two at Calcutta. In 1930 he sent a paper to the *Welt-Kraft Konferenz* (World-Power-Conference) at Berlin and in 1938 took part in the Indian Science Congress session at Calcutta along with several other Professors of Jadavpur College.

Three of Dr. Bose's designs have been announced, namely, the following : (1) Design of Nozzles and Blades (*Journal of the College of Engineering and Technology*, September 1935), (2) Design of a Refrigerator (*Annual Report of the National Council of Education*, 1938), (3) Design of a Gas Generator (*Annual Report of the N.C.E.* 1939).

Professor Bose functions on the directorates of Purulia Electric Supply Co. (Bihar) and Patuakhali Electric Supply Co. (Barisal).

Bose's dissertation for Doctorate in Engineering at the *Technische Hochschule* (Technological University) of Berlin was published as *Entwicklung des Dieselmotors*, "The Development of Diesel Motor" in *Motor-Wagen* (Berlin 1926). Some of his other papers are as follows :

1. "High Pressure Steam" (*Journal of the Association of Engineers*, Calcutta 1928).
2. "Krupp" (*Journal of the Association of Engineers and Indian Commerce and Industry*, 1929) based on a paper

read at the General Meeting of the Association of Engineers).

3. "Higher Education in Germany" (*Modern Review*, August 1929).
4. "Power Development in India" (World-Power Conference at Berlin 1930).
5. "Iron and Steel Industry in India" (*Journal of the Association of Engineers*, Calcutta, 1933).
6. "Engineering and Industrial Germany" (*Journal of the College of Engineering and Technology*, Jadavpur, 1933) based on a paper read at the *Bangiya Jarman Vidya Samsad*, Bengali Society of German Culture).

For Bose's membership in scientific societies may be mentioned his contacts with *Verein Deutscher Ingenieure* (Berlin), the Association of Engineers (Calcutta) and the Institution of Engineers (India).

It was during the world-economic depression that Professor Sudhir Chakravarti found himself as a student of Mechanical Engineering in the U.S.A. (1930-34) at Worcester and at Boston (Massachusetts Institute of Technology). It was possible for him to devote half a year (1932) to getting himself *mistrified* in Ford Motor Works at Dearborn (Michigan). The subject in which he specialized at M.I.T. (Boston) is refrigeration, cold storage and air-conditioning. These topics have been introduced by him at Jadavpur in 1943. Chakravarti is Chairman of the Board of Directors of Panel Pin Manufacturing Co. He is the Vice-President and one of the founders of the Science Club of Calcutta (est. 1942).

While in Germany (1929-32) Triguna Sen worked in the Research Laboratory of the *Hydraulisches Institut* (Hydraulic Institute) of Munich for three years. After doctoring in Mechanical Engineering he got *mistrified* for some time in the *Bayerische Landesamtliche Wasserversorgungsanstalt* (Bavarian Provincial Water-supply Works). He worked

likewise in the *Städtisches Tiefbauamt* (Municipal Water and Canal Works Office) at Munich for about six months. In India before joining Jadavpur College Dr. Sen was for four years General Manager of the Electric Supply Company of Dibrugarh (Assam). He is a member of the Indian Science Congress Association.

In the "Blue Earth" workshops of the U.S. Army located at Kidderpore (Calcutta) Sen got a number of Jadavpurians trained as paid apprentices for a short period just before the termination of hostilities with Japan (July-August 1945). In order to obtain some of the American machineries operating in these factories he paid a visit to New Delhi and had useful conversations with Cols. Welling, Ash and Gaynor as well as Captain Jones of the U.S. Army-Navy Liquidation Commission. He paid a visit likewise to Indore and interviewed the Secretary of the Govindram Sakseria Charity Trust with the object of getting a substantial donation for Jadavpur College.

Dr. Sen is, like Principal A. C. Sahagal of Baroda Engineering College, a representative of the Association of Principals of Technical Institutions on the All-India Board of Engineering Studies, which comprises, among others, Principal J. A. Taraporewalla of Poona Engineering College. In this capacity he is engaged, with the other members, in the rationalization and uniformization of syllabuses for All-India Diploma and Certificate Examinations in Engineering. Government of India's Central Advisory Board of Education (with Dr. John Sargent as Educational Adviser) finances this Board and its activities in connection with which Principal Sen attended a Committee Meeting at New Delhi on October 25, 1945.

Professor Atul Roy had a brilliant academic career at Glasgow University. He was the holder of Maclaurin Medal (1930-31) and of Faraday Medal (1931-32). In 1933 he

graduated with first class honours in Mechanical Engineering. During the period of tuition Roy got factory experience in regard to boilers and accessories in the firm of Babcock & Wilcox at Renfrew (Scotland). For sugar machineries and pumps etc. he worked with Mirlees Watson & Sons at Glasgow. In regard to agricultural machineries, tanks etc. the chances for factorification came to him c/o Thomson Bros. (Bilston), Wolverhampton.

From 1935 to 1940 Roy was employed as Higher Technical Officer in the Scientific Supplies section of India Store Department in London. In India he has been Director of many Tea Companies, Engineering Concerns and Chemical Firms.

As a student of Mechanical Engineering at the University of Sheffield Professor Satyendra Bimal Sen was the first among first class honours men. He graduated in 1928 and went over to Germany where he joined the *Technische Hochschule* of Hanover. There he took up Heat Transmission in Boiler Furnace as the subject of his research under the guidance of Dr. Ing. Melzeltin of Hanomag Works. But he had to abandon the work as foreigners were deprived of the facility for such investigations.

While in England Sen got factorified in the Yorkshire Engine Works at Sheffield. He was also employed in the London-North Eastern Railway Works at Doncaster. In Germany factorification was experienced by him at the Hanomag Locomotive and Machine Works of Hanover. The German State Railway Works at Hanover also afforded him facilities for practical training (1928-30).

In India he was General Workshop Superintendent and Assistant Loco Carriage Superintendent of Morvi State Railway Works in Kathiawar. For some time he was Mechanical Designer and Consulting Engineer with Harkishen Lall & Sons at Lahore. At Calcutta he was associated with

Martin's Light Railways as Locomotive Workshop Superintendent in charge of main workshop.

Professor Sen is an Associate Member of the Institution of Locomotive Engineers (London) as well as a member of the *Verein Deutscher Ingenieure* (Berlin).

Professor Hem Guha has experience of engineering education at two British Universities, Edinburgh and Glasgow. For six months he got himself *mistrified* at Albion Motor Works. Later he went through a course of *mistrification* for one year at Dykehard Collieries in Lanarkshire (Scotland). Since November 1927 he has been connected with Jadavpur and has been steadily at work in order to enable the students to get facilities for factorification at Jamshedpur, Burnpur and other engineering centres. His activities in connection with the Pavilion and Gymnasium are appreciated by his colleagues and students alike.

The Electrical Engineer, Manmatha Chakravarti, B.Sc. (Cal.), after graduation from Jadavpur (1925), worked for eight months at the Hydro-electric Works of Shillong (Assam). In 1931 he graduated with honours in Electrical Engineering at the Polytechnic Institute of Worcester (U.S.A.). At Purdue University (U.S.A.) his thesis for M.S. was entitled *Design of Artificial Transmission Line* (1932). From America he went over to Germany and was placed by the *Deutsche Akademie* of Munich for *mistrification* as an apprentice with the Siemens-Schuckert Works of Berlin. At this time he enjoyed a Guru Prasanna Ghosh Fellowship of Calcutta University. He spent a year also at the *Technische Hochschule* (Technological University) of Darmstadt. Later he was a paid Graduate Apprentice of the *Allgemeine Elektrizitäts-Gesellschaft* (General Electric Works) of Berlin (1935-36) in different capacities and enjoyed an excursion trip to Moscow (Russia) in that connection. As Measuring Instruments specialist he was sent over by the

A.E.G. to India and worked in their offices at Bombay, Calcutta and elsewhere from August 1936 down to September 1939, the outbreak of World-War II. For three years he worked with the Tisco at Jamshedpur before joining Jadavpur College in September 1942. He is a member of the Indian Science Congress Association.

After graduating from the Massachusetts Institute of Technology (Boston) with M.S. degree in Electrical Engineering Professor Nandlal Shah had some experience as Electrical Engineer at the Vikram Mills Ltd., Ahmedabad. For ten years he was a Consulting Engineer of Godhra and Bhavnagar Power Plants of the Godhra Electricity Co. Ltd. Ahmedabad. From 1920 to 1924 he was Secretary of the Ahmedabad District Congress Committee. For some time (1924-27) he was Professor of Mathematics and Registrar at the Gujarat Vidyapith, the National University established by Mahatma Gandhi, and was Municipal Councillor also of the Ahmedabad Municipality. During 1944-45 he was one of the Hony. Secretaries of the Gujarat University Mandal. Be it noted that Professor Shah had been connected with the civil disobedience movement in 1930.

CHAPTER IV

In Chemical Engineering

One of the highest distinctions of Harvard University (U.S.A.), namely, Phi Beta Kappa, was won by Hiralal Roy as by his N.C.E. college-comrade Naren Sen-Gupta in 1913. In 1924 he published a paper on Adsorption in the *Journal of the Indian Chemical Society* as collaborator of Professor Jnan Mukerjee of Calcutta University.

At the *Technische Hochschule* (Technological University) of Berlin Roy's thesis for doctorate in Chemical Engineering

(1925) was *Zustand der Materie in der adsorptierten Lage*. It was published as "The Condition of Matter in the State of Adsorption" in the *Journal of the Indian Chemical Society* (1926). In the monthly *Science and Culture* (1936-41) published from Calcutta University under the editorship of Professors Meghnad Saha, Sir Jnan Ghosh, Deben Bose, Priyada Roy, and Amulya Ukil, Dr. Roy had papers on the basic chemical industries of India, the historical aspects of thermodynamics, the physical and chemical composition of the interior of the Earth, as well as on techno-economic problems. Articles of industrial and economic importance have also been contributed by him, off and on, to the *Journal of the College of Engineering and Technology* (Jadavpur).

A paper by Roy in collaboration with Nirmal Sen-Gupta was published in 1941 under the title of "Flow of Liquids through Orifices" in the *Journal of Industrial and Engineering Chemistry* (American Chemical Society).

In 1929 Dr. Roy took part in the Indian Science Congress session at Madras with a paper on "Evaporation of Liquids in Still Air". For the session at Delhi (1944) he was the Recorder of the Section on Engineering and Metallurgy. The standardization of weights and measures was the subject of his talk at the Rotary Club of Calcutta in 1945 and of a paper at the Bangalore Session of Indian Science Congress (January 1946).

Roy is member of Indian Chemical Society, *Verein deutscher Chemiker* (Berlin), American Chemical Society, Institution of Chemical Engineers (London), Indian Science Congress Association, and Indian Science News Association. He is, besides, member of Tagore's *Visva-Bharati* and President of Indian Decimal Society. As Secretary of the Technical Education Subcommittee of the National Planning Committee (Bombay), sponsored by Jawaharlal Nehru, Roy submitted his Report in 1943. His Report as member of Technical Education Committee of the Government of Bengal

(Fazlul Huq and Nazimuddin Ministries) was submitted in 1945.

Professor Roy is connected with Universities in diverse ways. He is a member of the Calcutta University's Board of Post-Graduate Studies in Applied Chemistry. Andhra University has also elected him as a member of the Board of Studies. At the Calcutta University he is examiner in Physical Chemistry and Chemical Engineering, at Andhra in Chemical Engineering, at Dacca in Industrial Chemistry, at Benares in Engineering Chemistry and Chemical Engineering, and at Nagpur in Chemical Engineering. With Dr. Kane of Poona and others Roy is a member of the Government of India's Committee relating to the preparation of syllabus on Chemical Engineering for post-Matric Students.

Chemical and pharmaceutical works have often offered him problems relating to chemical machineries and used him as a Consulting Engineer. He was on the advisory board of Bengal Chemical and Pharmaceutical Works Ltd. for several years. At present he is a Consulting Chemical Engineer to the Chemical Corporation of India (Suren Roy) which manufactures chromide compounds, sodium bichromates, chromic acid, potassium bichromates and other articles in allied line.

The industrial, laboratory and factory experiences of Professor Banesvar Dass are varied. After graduation from Illinois (U.S.A.) he spent eight years (1914-22) for *mistrification* : (1) with Stoelting Co. of Chicago (manufacturers of scientific apparatus), (2) with National Synthetic Co., Perth Amboy (New Jersey) where he used to manufacture phenol and phenol derivatives as chief of the Control Laboratory, (3) with the Edison Concerns as Chief Chemist of the Carbolic Acid Division, Chief Chemist of the Coal Tar Products Division, and as a Research Chemist of the Central Laboratory where he worked on several problems relating to electroplating storage batteries, (4) with Celluloid Co. of America as a Research

Chemist and (5) with the Commercial Laboratories of Carleton Ellis working on the Hydrogenation of Oils as well as on Vitamins and their concentrates. Nos. 3, 4 and 5 are located in different towns (Silver Lake, Newark and Montclair) of New Jersey.

Dass spent two years in Germany also. He was the Director of an American Export-Import firm in the chemical department (1922-24), which used to supply German chemicals to the U. S. Navy. In one of the German engineering firms he was at the same time engaged in studying the processes and machineries for the expression and extraction of oils from seeds, and the refining and hardening of oils.

Dass attended the Indian Science Congress Session held at the Hindu University, Benares in 1925 and read a paper on "Food Products rich in Vitamins". In 1927 he read a paper on the "Prospects of Oil Industry in India" in the session at Lahore. He has taken part in the deliberations of the Chemistry Section of the Congress Session held at Calcutta in 1928 and 1935 and also in the Jubilee Session held likewise at Calcutta in 1938.

He has been examiner for about 10 years on the "Technology of Oils and Fats" at Harcourt Butler Technological Institute of Cawnpore. He has served for several years on the Food Committee and for two years on the Gas Committee of the Corporation of Calcutta. He has also acted as adviser on several committees of the Calcutta Corporation such as the Workshop Committee, the Waterworks Committee on the chlorination of water and the Fuel Committee (1925-35). During World-War II he read a paper before the Corporation Engineers' Club on the use of "Vegetable Fats as Fuels" for Diesel Engines. The Corporation was then facing a great fuel shortage (1943).

During 1926-30 several lectures were delivered by Dass before the Bengal National Chamber of Commerce on subjects

like the following : 1. Prospects of Oil Industry in India, 2. Manufacture of Vegetable Ghee, 3. Prospects of Technological Industries in India, 4. Chlorination of Calcutta City Water, and 5. Fertilizers for India.

A meeting of the Professors and students of the Calcutta University College of Science was addressed by him in 1924 on the "Hydrogenation of Oils".

At the *Bangiya Dhana-Vijnan Parishat* (Bengali Institute of Economics) the following topics were discussed by him during 1932-1935 : 1. Manufacture of Sugar on small scale, 2. Prospects of Chemical Industry in India, 3. Planning of Industries in India.

Dass is adviser of several limited concerns, and is also a consulting engineer to some firms.

Dass's researches in the Chemical Laboratory of Jadavpur College deal with the preparation of (1) vegetable ghee, (2) vegetable tallow, (3) vegetable casein, (4) vegetable butter, (5) vegetable casein-ghee, (6) silica cement and other cements, (7) mortar with molasses, (8) vegetable milk from ground-nuts, (9) milk products from ground-nut milk, (10) milk products from cows' milk, (11) malt, maltose syrup etc., (12) utilization of vegetable cakes in industries, utilization of brass scraps and other scraps, (13) manufacture of soap (toilet and washing) without using animal fats (vegetable soaps), (14) manufacture of peanut butter.

Some of the results of his researches have been published in the *Journal of the Bengal National Chamber of Commerce, Insurance and Finance Review, Journal of the College of Engineering and Technology*.

Dass is president of the Lake View H. E. School, member of the Ballygunge Girls' College, and an honorary member of the Bengal National Chamber of Commerce. He is, besides, Hon. Adviser to the Research Fellows of *Bangiya Dhana-*

Vijnan Parishat (Bengali Institute of Economics) and *Bangiya Samaj Vijnan Parishat* (Bengali Institute of Sociology).

In connection with discussions on railway freight with the Railway Advisory Board Dass has been drawn upon by the Bengal National Chamber of Commerce for suggestions and expert advice.

Dass's publications may be listed below :

1. Industrial Research (*Modern Review*, Calcutta, 1923).
2. Prospects of Oil Industry in India (*Modern Review*, November 1926).
3. Hydrogenation of oils and its commercial possibilities in India (*Journal of the Bengal National Chamber of Commerce*, 1927).
4. An Industrial experiment at the Mahalakshmi Oil Mill, Samsi, Malda. The Pungency of Mustard Oil obtained from Expellers. (*Journal of the Bengal National Chamber of Commerce*, 1928).
5. Fertilizers for India (*Journal of B. N. C. C.*, 1928).
6. The Importance of Chemical Technology in India (*Bengal Technical Institute Magazine*, 1928).
7. Chlorination of Calcutta City Water (*Calcutta Municipal Gazette*, April 1929).
8. Crushing of Indian Cotton Seeds and the commercial utilization of products obtained (*Journal of B. N. C. C.*, 1931).
9. "Manufacture of Sugar from Gur" (*Insurance and Finance Review*, 1931).
10. "Toilet Soap from Cotton Seeds Oil" (*Insurance and Finance Review*, October 1933).

Dass has compiled and edited two volumes of *Banglay Dhana-Vijnan* (Economics in Bengali 1937, 1939) and one volume of *Samaj-Vijnan* (Sociology, 1938) with the assistance of several Hony. Research Fellows of the Bengali Institutes of Economics and Sociology. He is, besides, the editor of

The Social and Economic Ideas of Benoy Sarkar (1940) for which twelve authors have contributed special papers and Dr. Narendra Nath Law the General Introduction.

CHAPTER V

IN GEOLOGY

Geology is a key science at Jadavpur College. It is indeed a key science in every scheme of industrialization. All the Fourth (Final) Year students in Mechanical, Electrical and Chemical Engineering have to take a course in geology with Shib Deb, Dr. es Sciences (Paris). There is no special Department of Geological Engineering at the College as yet. So it is treated as a part of the Humanities or General Culture. It is a fundamental discipline with every denomination of engineers and may properly belong to the cultural course.

In case "Big Business", e.g., Tata Trust, takes interest, as is being confidently hoped by the Alumni Association and College authorities, a special course in Engineering Geology may be started in the near future. Sir Ardeshir Dalal of the Government of India while visiting Jadavpur College in 1944 drew the attention of the College authorities to the desirability of such a department. It can be opened by Dr. Deb who has had practical experience both in scientific geology as well as geological engineering at home and abroad.

After graduation in 1926 Deb was Research Assistant in the Geology Department of the Indian School of Mines at Dhanbad. There he acquired experience in geological mapping of the coal-field as well as in teaching geology to the mining students.

On study leave he proceeded to the University of Paris in 1933. At the Sorbonne he worked in the *Laboratoire de géologie appliquée* under Professor Léon Bertrand, and attended lectures and practical classes on (1) Engineering

Geology, (2) Ceramics and Refractories, and (3) Ore-deposits and Fuel Technology.

In 1935 he was awarded a research scholarship from the Educational Trust of the *Ministère des affaires étrangères*, to carry on research work under Bertrand on refractory sand suitable for foundry purposes. The State Doctorate degree (*Docteur es sciences naturelles*) in Applied Geology, with mention "très honorable", on a thesis entitled the "Petrological, Stratigraphical and Economic Study of the Tertiary Rocks of the Maritime Alps, Southern France", was granted to him in 1938. It has been printed as a Memoir of the Geological Society of France (1938).

During 1938-39, he worked in the Laboratory of Prof. Alfred Lacroix, *Secrétaire perpétuel à l'Académie des Sciences*, to study ore-microscopy and ore-dressing, and published two papers on the microscopic study of the Indian manganese ores. About this time he visited almost all the important Geological Laboratories and study centres in Cambridge, London, Zurich, Innsbruck, Vienna, Munich, Berlin and Rome (1938-40).

In France he was employed for his practical work in the aluminium centre of mining industry of the Alpes Maritimes District.

In 1940 he came back to India and was appointed part-time Lecturer in applied geology in the Post-Graduate Science Department of Calcutta University on the retirement of Prof. Kiran Sen-Gupta. He is at present teaching ore-microscopy and its industrial applications.

He was appointed Lecturer in Engineering Geology at Jadavpur College in 1943.

With the University of Calcutta Dr. Deb is associated also as examiner. He is examiner at the Benares Hindu University. He is a Fellow of the *Société Géologique de France* (Paris) as well as of the Geological Mineralogical and

Metallurgical Society of India. He has been a consulting geologist to J. K. Industries (Cawnpore) and Bhowalka Bros. (Calcutta). Non-ferrous metals like aluminium, lead, zinc, copper, etc. constitute the chief items of his scientific and industrial interest. He has attended the Indian Science Congress Sessions at Calcutta (1943), Delhi (1944), Nagpur (1945) and Bangalore (1946) with papers, the summaries of which are to be found in the *Proceedings*.

Some of Deb's published papers are enumerated below :

1. A short note on some new fossil plants from Jabbalpur, C.P. (*Quarterly Journal of the Geological Mining and Metallurgical Society of India*, 1932).
2. Etude des saleles rouges d'âge éocène des Alpes Maritimes (*Compte Rendu Sommaire de la Société Géologique de France*, 1935).
3. Sur la découverte d'un Orbitoïde dans les grès d' Annot Alpes Maritimes et sur ses conséquences (*Compte Rendu de l'Académie des Sciences*, 4 November 1935).
4. Sur la découverte de Nummulites dans les grès nummuliques des Alpes Maritimes et sur l'origine de cette série de couches (*C. R. Ac. Sc.* 18 Nov. 1935).
5. Etude sur les conditions de dépôt de la série des grés d'Annot dans les Alpes Maritimes (*C. R. Somm. S. Géol. Fr.* 1936).
6. Etude pétrographique de roches volcaniques tertiaires dans la partie méridionale des Alpes Maritimes (*Bulletin de la Société Géologique de France*, 1936).
7. Sur la découverte des micro-organismes dans le plaisirneur des Alpes Maritimes (*C. R. Som S. Géol. Fr.* 1937).
8. Contribution à l' étude stratigraphique et pétrographique des roches tertiaires des Alpes Maritimes (*Mémoire Soc. Géol. de France* 1938).
9. Sur les minéraux de manganèse latéritiques de la région

de Belgaum, près Goa, S.W. de l'Inde. (*Congrès des Sociétés Savantes*, 1939).

10. Microscopic characters of some manganese minerals, found in the lateritic manganese-ore of Belgaum District, S.W. India. (*Current Science* 1939).
11. Optical X'ray and magnetic studies of the mineralogical constituents of vredenburgite from different occurrences in India. (*Q. Jour. Geol. Min. Met. Soc.* 1943).
12. Occurrence of Barytes of economic importance in the neighbourhood of Bhatgaon Village, near Katni, Jabbalpur District C.P. (*Proc. Ind. Sc. Congress*, 1943, Calcutta).
13. Occurrence of fluorspar in Malban, Jabbalpur District, C.P. (*Proc. Ind. Science Congress*, 1944, Delhi), and *Current Science* (with S. K. Roy) April 1945.
14. Occurrence of natural salts and selenite gypsum in Lunkaransar Lake area, Bikaner State, Rajputana (with K. Pal) (*Proc. Ind. Sci. Congress*, Bangalore, 1946).

CHAPTER VI

In the Humanities

The publications of the National Council bring to the Jadavpur Campus ideas, ideals and ideologies from far and near. Socialism and communism as developed in contemporary Eur-America has been Bengalicized, in a book of some 240 pages, by Daval Ghosh from an English text by Woolsey. In Phani Tarkavagisha's *Nyaya-Parichaya* (Bengali book, 1933, 380 pages) ancient Indian logic has found a lucid presentation, while Old India's political morphology is to be found in the present author's *Hindu Rastre Gadan* (The Constitution of the Hindu State, 1927, 370 pages), and a philosophy of history with special reference to the culture-life of ancient India is available in Pramatha Mukerjee's

Itihasa O Abhivyakti (History and Evolution, 1929, 600 pages). On the other hand, Kali Das-Gupta's two large books in Bengali deal with Hindu social institutions in the frame-work of modern socialism. One is entitled *Hindu Samaj-vijnan* (Hindu Sociology, 800 pages), and the other *Hindu Socialism* (770 pages). All the Hem Basu-Mallik and Probodh Basu-Mallik lectures are not yet available in book form. Many or most of them have appeared in journals.

The N. C. E. does not seem to have any provision for the publication of the lectures on religion by the Professors of the "General Department." The members of this department (See Appendix C, I) have perhaps overlooked this consideration. There should be provision likewise for publishing in a convenient form the Extension Lectures delivered under the auspices of the "Greater India" Society with the financial co-operation of the N. C. E. Publications of all types ought to demand greater attention on the part of the authorities of Jadavpur College.

Attention may here be incidentally drawn to the numerous philosophical treatises and essays by Mukerjee. His *Approaches to Truth and World as Power* (in three volumes, *Power as Matter*, *Power as Causality and Continuity* and *Power as Consciousness*) are substantial contributions from a philosophically gifted mind. In his *Introduction to Vedanta Philosophy* (Sreeopal Basu-Mallik Lectures at Calcutta University 1927) the reader comes into contact with modern interpretations of an ancient system. Some of his other works in English are entitled (1) *Patent Wonder*, (2) *India Her Cult and Education*, (3) *National Education in India*, and (4) *An Essay on Radioactivity*. Among his Bengali works may be mentioned *Shikshar Ekti Katha* (A Word on Education), *Swabhavik Shavda va Mantra* (The Natural Sound or Mantra) and *Veda O Vijnan* (Vedas and Science).

Equally if not more productive as author was Das-Gupta. In the field of *belles lettres* he was known as the author of over two dozen novels or stories. He wrote a number of books for young boys and girls about the exploits of the Rajputs, the womanhood of India, and the anecdotes of the *Ramayana* and the *Puranas*. The themes of over a dozen Sanskrit dramatic works like *Mudra-raksasa*, *Malavikag-nimitra*, *Karpura-manjari*, and *Shakuntala* were rendered into Bengali prose by Das-Gupta for a handy volume.

Works like these produced by the Professors of the N.C.E. serve to enrich the machinistic *milieu* of *mistris* (technicians and engineers) of all grades, high, medium and low, with spiritual values of considerable magnitude. It is full-blooded men and not merely machines that are being manufactured on the Jadavpur Campus, as has already been stressed in a previous context (See pp. 17-18).

In regard to the lectures of Professor Abani Roy, M.A. B.Com. (Edin), the *Tech 1944* writes as follows: "We have been taught to correlate an engineering skill with a knowledge of accountancy and he has shown us how production cost can be controlled and scientific management introduced. His enterprise and lively energy will remain as an example for all of us." Roy is described as "a chartered accountant by profession but a teacher by nature."

Roy has been practising as a Chartered Accountant in Calcutta since 1932. Towards the beginning of the century he was in Government service as an Accountant in Burma Battalions. Academic urges took him to the United Kingdom. His British experience ranged from 1919 to 1932. By 1923 he was Bachelor of Commerce and Master of Arts at Edinburgh. For six years he worked as an articled clerk with the firm of Copeland and Allan, Chartered Accountants, Glasgow. The next four years he devoted to independent practice in England in order to acquire experience in costing. During this period

he audited the accounts of Rob Brothers, Healy and several smaller firms. He did also the cost accounts of Inkoff and Greensteins, Mantle Manufacturers. After this kind of "factorification" in accountancy for ten years Roy came back to India as a Member of the Institute of Accountants and Actuaries in Glasgow and a Fellow of the Society of Incorporated Accountants and Auditors (London).

Modern culture is communicated to the budding engineers of the Jadavpur Campus through the lectures on contemporary and current history by Shiva Sen, B.A. Hons. (London). He is connected with the Post-Graduate teaching in history at the Calcutta University as part-time Lecturer. Sen was in London from 1933 to 1938 and travelled extensively in England, Scotland and Wales. The continent was visited by him during this period.

Sen is a member of the Royal Asiatic Society of Bengal, the Indian History Congress, and the *Société de l' Histoire de l' Inde Française* (Pondichery). In 1945 he attended the Indian History Congress at Annamalai. The paper was entitled "An Abortive Franco-Maratha Treaty of Alliance (1783)". At the Indian Historical Records Commission which sat at Peshawar in 1945 Sen read a paper on "The Correspondence of Montigny, a French Diplomatic Agent at the Court of Poona (1778-87).

One of Sen's books, *The French in India, Their First Establishment and Struggle* (1664-1674), is being published by the Calcutta University. His *Studies in Caliphate Public Finance* was out in 1942 (Bogra).

Objectively considered, all the works of the present author may be said to belong to the list of the N.C.E.'s publications. His *Shiksha-Vijnan* (Science of Education) series in Bengali (nearly 2000 pages) was recognized by the N.C.E. Reports from 1906 to 1914 as a contribution to the national

education movement in Malda and Bengal. The other works of the same period, appearing in a new edition of two volumes as *Yuvak Banger Jivan Prabhat* (The Dawn of Life in Young Bengal), were likewise announced as N.C.E. publications in the *Annual Reports*. The Sanskrit *Sukraniti* in English translation and *The Positive Background of Hindu Sociology* Vol. I appeared in 1913. It was as Probodh Başu-Mallik Fellow (Hony.) of the N.C.E. that he was Guest-Professor in the Universities of America and Europe from 1914 to 1925 and brought out works like *Chinese Religion through Hindu Eyes* (Shanghai, 1916), *Love in Hindu Literature* (Tokyo, 1916), *The Folk-Element in Hindu Culture* (London, 1917), *Hindu Achievements in the Exact Science* (New-York, 1918), *The Political Institutions and Theories of Hindus* (Berlin 1922) and *The Futurism of Young Asia* (Leipzig, 1922). In connection with Calcutta University since 1926, and as Hony. Rector (1929) as well as Hony. Professor of Economics of the N.C.E. he has published *Economic Development* (two volumes, 1926, 1932), *Indian Currency and Reserve Bank Problems* (1933), *Imperial Preference Visàvis World-Economy* (1934), *Social Insurance Legislation and Statistics* (1936), *The Political Philosophies Since 1905* (four volumes, 1928, 1942), *Villages and Towns as Social Patterns* (1941), and *The Equations of World Economy* (1943). Works in Bengali on cultural, economic and sociological subjects have also to be mentioned for this period (For foreign travels and investigations 1929-31 see p. 52).

The present author has contacts with several learned societies and socio-cultural associations at home and abroad. In India he is associated with *Bangiya Sahitya Parishat* (Bengali Academy of Literature), Indian Economic Association (Allahabad), Indian Political Science Association (Allahabad), Indian Science Congress Association (Calcutta), Indian Penal Reform League (Bombay), Indian Institute of

International Affairs (affiliated to the Chatham House Institute, London), Indian Council of World Affairs (Delhi), Rotary Club (Calcutta), Academy of Fine Arts (Calcutta), Indian Institute of Agricultural Economics (Bombay), Indian Statistical Institute (Calcutta), *Alliance Française* (Calcutta), *English Speaking Union* (Calcutta), Indo-American Association (Calcutta), and Indian P.E.N. (Bombay, as Life Member), as well as with the Bengal National Chamber of Commerce (as Hony. Member). He has also been making cultural, economic and sociological contributions to Indian journals (quarterly, monthly, weekly and daily) both in Bengali and English since 1906.

He is Life Member of *Société d' Economie Politique* (Paris), Royal Economic Society (London), and Royal Asiatic Society (Shanghai), as well as Member of *Institut International de Sociologie* (Paris), and *Deutsche Morgenländische Gesellschaft*, and American Sociological Society. He is, besides, Hony. Member of *Hobbes Gesellschaft* (Kiel), *Institut Oriental* (Prague), *Comitato Italiano per lo Studio dei Problemi della Popolazione* (Rome), *Komisja Orientalistyczna* (Warsaw), *Indischer Ausschuss der Deutschen Akademie* (Munich), *Philosophia* (England), and *Istituto Italiano per il Medio ed Estremo Oriente* (Rome).

Finally, he is the Founder and Hony. Research Director of *Bangiya Dhana-Vijnan Parishat* (Bengali Institute of Economics), "Antarjatik Banga" Parishat ("International Bengal" Institute), *Bangiya Jarman Vidya Samsad* (Bengali Institute of German Culture), *Kalikatay Maldaha Samiti* ("Malda in Calcutta" Society), *Bangiya Samaj Vijnan Parishat* (Bengali Institute of Sociology), *Bangiya Asia Parishat* (Bengali Asia Academy) and *Bangiya Dante Sabha* (Bengali Dante Society). He edits the monthly *Arthik Unnati* (Economic Progress) established by himself in 1926 with the help of Dr. Naren Law and other scholars. He

was the editor of the *Journal of the Bengal National Chamber of Commerce* as long as it ran (1926-32).

The following American Journals have published contributions by the present author: *School and Society* (New-York, 1917), *International Journal of Ethics* (Chicago 1918, 1920), *Political Science Quarterly* (Columbia University, 1919, 1920, 1921), *Journal of Race Development* (Clark University, 1918), *Scientific Monthly* (New-York, 1919), *American Political Science Review* (1919), *Open Court* (Chicago, August 1919, November 1919), *Journal of International Relations* (Clark University, 1919, 1921), *Annals of the American Academy of Political and Social Science* (Philadelphia, 1921), and *Social Forces* (Chapel Hill, N.C. 1937). Writings in the *Times* (March 1917), the *World* (September 1918), the *Nation* (July 1920), and the *Freeman* (July and October 1920), all of New York may also be mentioned.

In French his studies have been published in the following journals: *Revue de Synthèse Historique* (Paris, 1920, 1930), *Séances et Travaux de l' Académie des Sciences Morales et Politiques* (Paris, 1921), *Revue Internationale de Sociologie* (Paris, 1936), *Revue de Synthèse* (Paris, 1937) and *Travaux du Congrès International de la Population* (Paris, 1938).

His German contributions may be seen in the following journals: *Deutsche Rundschau* (Berlin 1922, 1930), *Mitteilungen Vereins deutscher Ingenieure* (Berlin 1924), *Weltwirtschaftliche Nachrichten* (Vienna 1930), *Berichte über Landwirtschaft* (Berlin 1931), *Neumann's Zeitschrift für Versicherungswesen* (Berlin 1931), *Bankwissenschaft* (Berlin, 1931), *Geopolitik* (Berlin 1931, 1938, 1939), *Maschinenbau* (Berlin, 1931), *Allgemeines Statistisches Archiv* (Jena 1931), *Kölner Vierteljahrshefte für Soziologie* (Cologne, 1931),

Bevölkerungsfragen (Munich 1936), and *Archiv für Bevölkerungswissenschaft* (Leipzig, 1937).

The Italian writings of the present author have been published in the following journals: *Giornale degli Economisti e Rivista di Statistica* (Rome, 1920), *Annali di Economia* (Milan 1930), *Commercio* (Rome, 1931), *Atti del Congresso Internazionale per lo studio della Popolazione* (Rome 1931), and *Congresso Internazionale degli Orientalisti* (Rome 1936).

CHAPTER VII

The Journal of the C.E.T.

As a centre of publications,—whether techno-scientific or humanistic,—the N.C.E. is hardly yet known. *The Journal of the College of Engineering and Technology*, therefore, richly deserves mention in this context. It has been functioning as the organ of Jadavpur's contacts with *vishwa-shakti* (world forces) in the domain of sciences and industries. Established in 1928, this *Journal* has served to enrich Young Jadavpur and Jadavpurians (the alumni) as well as the Indian world of engineers, businessmen and industrial researchers with new experiences and ideologies. In the interest of greater usefulness and serviceability the editors (students and professors) may be advised to initiate a section for the reproduction of meaningful passages from well-established journals of science, engineering, technology, agriculture, industry, commerce and applied economics such as are published in the two hemispheres. It should also be possible thereby to exhibit the *liaisons* between engineering and culture, technology and humanism, science and society, as well as material inventions or discoveries and human welfare.

PART VI

Greater Jadavpur

CHAPTER I

The Key to Past Progress

SECTION 1

*Creative Forces in the Evolution of Jadavpur College** .

In a previous chapter we have indicated some of the principal activities and incidents in the career of Bengal National College, Bengal Technical Institute, and Jadavpur College. The evolution has been shown in chronological order in important date-groups. It remains to analyze this calendar and chronology of evolution and single out the leading creative forces that have given a push to the N.C.E. in its dynamic march. The key to past progress may perhaps be caught hold of in this analysis.

Creative forces are of course to be detected, first, in dynamic and pushful men as scholars, organizers and educationists. Secondly, movements of a critical or constructive character are to be noticed. Obviously they should comprise wars and other socio-political transformations at home and abroad. In the third place, grants of money constitute by no means the least creative of agencies in social affairs.

Some of these *élan*s or urges in the N.C.E.'s career may be indicated with dates as follows :

A. 1905-09

1905. The Bengali revolution of 1905 is the foster-parent of the national education movement.
- 1905-08. The idealism, patriotic activities, techno-scientific drives and educational enthusiasm of Satis Mukerjee

* This section is to be read along with Section 3. (Ten Dynamic Factors) as well as with Part II. (The Calendar of Jadavpur College in Evolution 1905-45), pp. 43-68.

(Dawn Society), Brajen Roy-Chowdhury (Zamindar), Gooroodas Banerjee (Ex-Judge), Hiren Datta (Attorney), Ashu Chowdhury (Barrister), Aurobindo Ghosh (Professor of Literature), Tarak Palit (Barrister), Maharaja Surya Acharya (Zamindar), Maharaja Manindra Nandi (Zamindar), Subodh Mallik (Zamindar), Rashbehari Ghosh (Advocate), Nilratan Sarkar (Medical Practitioner), Abdul Rasul (Barrister) and Pramatha Bose (Geologist) pioneer into existence the N.C.E. system of education calculated to promote "*mistrification*" and machinization combined with general culture and humanism. The *zamindari* endowments made by Brajen Roy-Chowdhury, Subodh Mullik, and Surya Acharya belong to this complex of idealistic creativities.

1907-10. The teaching of "*mistrification*" and engineering is in the hands of B. B. Ranade (mechanical engineer from Bombay), V. K. Paranjpye (electrical engineer from Bombay), Nagen Rakshit (foreman mechanic from Jamalpur, E.I.Ry.), Sarat Datta (mechanical engineer from Berlin), Gopal Sen (Chemist from Leeds), R. Coulon (Chemist from Paris), Jatin Das-Gupta (mechanical engineer from Glasgow), Bhim Chatterjee (Electrical engineer from Roorkee) and Purna Ganguli (mechanical engineer from Glasgow).

B. 1910-19

1910-11. Fifteen scholars of the National Council of Education and the *Maldaha Jatiya Shiksha Samiti* (Malda District Council of National Education) are sent to the U.S.A. for higher education in science, engineering and industry with a view to eventual employment as professors in the national education movement. Another dozen scholars of this system proceed to the U.S.A. on their own resources or under the auspices of Jogen

Ghosh's Association for the Scientific and Industrial Education of Indians in Foreign Countries (estd. 1904). The following Professors of Bengal Technical Institute and Jadavpur College have since then belonged to these American-educated groups: Jatin Set (Harvard, Physics), Hiralal Roy (Harvard, Chemistry), Hem Das-Gupta (Michigan, Mechanical Engineering), Suren Roy (Harvard, Electrical Engineering), and Banesvar Dass (Illinois, Chemical Engineering).

1913. Jatin Set, A.B. (Harvard) and Hiralal Roy, A. B (Harvard) join the N.C.E. as Professors of Physics and Chemistry respectively.

1914-18. World-War I. furnishes country-wide technoscientific and economico-industrial urges for the *mistrification* of young men and mechanization of culture and enables Bengal Technical Institute to justify its existence in the eyes of educated India.

1917. Hem Das-Gupta, B.M.E. (Michigan) joins Bengal Technical Institute as Professor of Mechanical Engineering, after working for several years as Director of *Maldaha Jatiya Shiksha Samiti* (District Council of National Education, Malda) on his return from the U.S.A. in 1913.

C. 1920-29

1920-23. The Non-Co-operation Movement of Gandhi and the *Swaraj* politics of Chittaranjan Das reproduce under new conditions the anti-University and anti-Government schools ideology of the period 1905-08 and furnish the social background of the N.C.E.'s expansion in post-war years.

1921. The Rashbehari Ghosh Endowment of nearly Rs. 1,600,000 constitutes the greatest single force in the national education movement after 1905-08.

1922-24. Professor Satis Chakravarti has papers on "The Evaluation of Some Factorable Continuants" in the *Bulletin of the Calcutta Mathematical Society*.

1923, September. The Department of Electrical Engineering is strengthened by the appointment of Professor Suren Roy, M.E.E. (Harvard). Roy is the first man with an E.E. degree to be appointed by the N.C.E.

1924, June. Bengal Technical Institute is planted at Jadavpur.

1924, Sept. The Chemical Engineering Department is strengthened by the appointment of Professor Banesvar Dass, B.S.Ch.E. (Illinois), who returns to India after nearly twelve years of University studies and factory experience in the U.S.A. and Germany. Dass is the first man with a Ch.E. degree to be appointed by the N.C.E.

1925-26. Three Professors of the N.C.E., come back from Berlin as Dr. Ing. (Doctors of Engineering), namely, Hiralal Roy (Chemical Engineer), Satis Bhattacharya (Mechanical Engineer) and Jatin Bose (Mechanical Engineer), and contribute to the efficiency of the College.

1925-27. Professor Banesvar Dass attends the Indian Science Congress Session at Benares (1925) with a paper on "Food Products Rich in Vitamins" and at Lahore (1927) with a paper on the "Prospects of Oil Industry in India, thereby initiating the scientific contacts of Jadavpur College with the chemists, botanists and other scientists as well as industrialists of India.

1927. The annual grant of Rs. 30,000, initiated by the Corporation of Calcutta, many of whose Councillors are inspired by the Swarajist principles of Chittaranjan Das (1870-1924) becomes a substantial support of the N.C.E. A non-recurring capital grant is later made by the Corporation (Rs. 57,000) in 1933. The Alumni Association helps the Corporation to understand the values and requirements of Jadavpur College.

1927, Nov. The Electrical Engineering Department is strengthened by the appointment of Professor Hem Guha, B.Sc. (Edin).

1928. Professor Satish Chakravarti attends the Indian Science Congress at Calcutta with a paper on "A Factorial Continuant".

1929. Professor Hiralal Roy attends the Indian Science Congress at Madras with a paper on the "Evaporation of Liquids in Still Air."

D. 1930-39

1930-31. Civil Disobedience Movement in the political sphere.

1934. Professor Sudhir Chakravarti who had been in the U.S.A. since 1930 returns with B.S. from Worcester and M.S. from Michigan in Mechanical Engineering and resumes his duties, thereby strengthening the Department.

1935. The Exhibition of Industrial Goods turned out of the factories and workshops managed by firms in which Jadavpurians play a leading role.

1937-40. The Alumni (Old Boys) Association of the N.C.E. commences developing constructive activities in order to further the organizational, pedagogic and financial interests of the *Alma Mater*.

In this "alumnification" are to be noticed the beginnings of a *renaissance* of the N.C.E. and Jadavpur College.

1938. Jadavpur College associates itself with the Jubilee Functions of the Indian Science Congress at Calcutta.

1939, March. A Special Committee is constituted of Dr. Shyama Prasad Mukerjee (Educationist), Dr. Naren Law (Businessman and Banker), Barrister Jogesh Chowdhury, Rama Prasad Mukerjee (Advocate and Educationist), Councillor Nalin Paul, Manmatha Datta (Civil Engineer), Professor Purna Ganguli (Mechanical

Engineer), Professor Hiralal Roy (Chemical Engineer), and Satya Bose (Advocate) in order to inquire into the conditions of the N.C.E. and Jadavpur College. An Expert Committee is likewise constituted with Hari Bhaumik, B.A., M.I.E., late Electrical Engineer in Chief, Posts and Telegraphs, Govt. of India, and Professor Purna Ganguli to inquire into the courses of studies, syllabus, etc.

1939. Professor Satish Chakravarti attends the Indian Science Congress at Lahore with papers on (1) A Pair of Factorable Recurrents and (2) An Algebraic Identity and a Unit Recurrent.

E. 1940-45

1939 Sept.-45 Sept. World-War II compels literate classes to appreciate *mistrification* and machinization as indispensable factors in education, directs them to the facilities offered by Jadavpur College and renders them conscious of its limitations in view of the tremendous technoinustrial needs of the people.

1941. The brain-trust of the N.C.E. is considerably fortified by the acquisition of young engineers and/or industrialists such as Atul Datta, Sachin Banerjee, Suren Datta, Prafulla Banerjee, Kiron Roy and Amar Haldar, as well as the veteran communication-engineer, Hari Bhaumik, as members of the Executive and Managing Committees. The N.C.E. begins to get "alumnified", i.e. enriched with its Alumni or "Old Boys" as administrators.

1941. Professor Satish Chakravarti has papers on (1) Some Algebraic Relations and (2) A Special Recurrent at the Indian Science Congress Session held at Benares.

1942. The Department of Electrical Engineering is strengthened by the appointment of Professor Manmatha Chakravarti, B.S. (Worcester) and M.S. (Purdue), who in addition to American University training (1930-34)

commands factory experiences in Germany as well as those derived from the Tata Iron and Steel Co. at Jamshedpur.

1943. The appointment of Dr. Triguna Sen, Dr. Ing. (Munich), Professor of Mechanical Engineering, as Special Officer with the object of developing the financial and other resources of the College is an index to the consciousness of the N.C.E. authorities that creative, deliberate and goalful steps have to be taken.

1943. Jadavpur College is enriched by the inauguration of lectures on applied geology by Dr. Shiva Deb, Dr. es Sciences (Paris).

1945, Feb. Degrees (B.M.E., B.E.E. and B.Ch.E.) are conferred on successful candidates by the N.C.E. for the first time at the Annual Convocation.

1945, December 9. Contacts between the N.C.E. and the Alumni are intensified and rendered intimate on account of the procession of the alumni, class by class, from 1910 to 1945, introduced at the Annual Convocation for the first time in the history of the N.C.E. Jatin Set, A.B. (Harvard), as the seniormost alumnus, leads the procession holding the flag of 1910. This new feature is likely to carry forward the "alumnification" of the N.C.E. to its material and social profit.

The course of evolution is quite encouraging. Jadavpur has all the time been growing from more to more. The problem of the hour is to make it still greater. Educational engineers and industrial architects have to come together and on the present foundations construct a decent "Greater Jadavpur" such as may satisfy the people's increasing requirements of the next two decades or so. It is time to get orientated to the new vistas and make preparations for the responsibilities of "another life beyond."

There is a mentality which takes delight in thinking or believing that there has been a falling off in recent years in the *morale* and the ideals of the N.C.E. Perhaps it is in comparison with the aspirations and activities of the period 1905-10 that this alleged decline is suspected. The aspirations and activities of the last five years (1940-45) may, then, be objectively analyzed by pessimists and sceptics. It is questionable if in academic efficiency, technocratic skill, devotion to *Alma Mater*, spirit of self-sacrifice, organizing ability, capacity for industrial management, or enthusiasm for patriotic service, the atmosphere of Jadavpur College today can be objectively and statistically proven to be inferior to that of Bengal National College or Bengal Technical Institute during the epoch of the glorious Bengali revolution.

SECTION 2

“Greater India” and Young Jadavpur

Foreign-schooled and foreign-factoried teachers have been among the most fruitful sources of strength to Jadavpur College. The acquisition of such teachers from time to time since 1913 and especially since 1923 is one of the greatest factors in the progress of the N.C.E. In the evolution of Jadavpur College its direct and indirect contacts with the *vishwa-shakti* (world-forces) through the friendly services of Indian scholars, industrialists, businessmen and publicists resident or travelling in Eur-America have to be appraised as some of the potent and substantial creative agencies. It is through these agencies that the *liaison* of Young Jadavpur and the Alumni Association with the techno-scientific developments of progressive nations has been kept up somewhat continuously. Jadavpur's debt to foreign intercourse is immense.

From Hiralal Roy, A.B. (Harvard), Dr. Ing. (Berlin) or rather from Sarat Datta, *Diplom-Ingenieur* (Berlin), Gopal Sen, M.A. (Leeds), and Jatin Das-Gupta (Glasgow) to Shiva Deb, Dr es Sciences (Paris), Atul Roy, B.Sc. Hon. (Glasgow), Nandlal Shah, M.S. (Mass. Inst., Boston), and Satyen Sen, B.Sc. Eng. (Sheffield), the impacts of international culture-contact on the Jadavpur Campus and on the N.C.E.'s techno-pedagogic ideologies have been growing from more to more. It is an objective reality that improvements in the teaching of Young Jadavpur have advanced *pari passu* with the growth and development of this tradition in acculturation to foreign norms. Personal intimacy and first-hand contact with pioneering Eur-American men, institutions and movements in industry, technocracy, science and education have enabled the teaching corps of the N.C.E. to inspire their students with genuine enthusiasm for engineering and technology, industry and business organization.

This objective fact in the career of Jadavpur College should not fail to furnish a suggestive hint to the N.C.E. and the Alumni Association as to one of the methods by which further progress of this institution may be fostered. In the first place, they will have to obtain a larger and larger number of foreign-schooled and foreign-factoried teachers for their staff. Secondly, they will have to keep themselves in constant intercourse with those Indian men and women of creative will and intelligence who have been constructing a "Greater India" in Eur-America as well as Africa and Asia by establishing centres of Indo-foreign culture-contact. It is through this Greater India that Young Jadavpur can be enabled in a considerable measure to utilize the *vishwa-shakti* (world-forces) in engineering, technology, science, research and industrialism for the progress of the motherland.

In the interest of Greater Jadavpur the cultivation of friendly relations with foreigners at home and abroad ought

likewise to be promoted according to plan by the N.C.E. and the Alumni Association. For instance, it should be understood that many of the Technological and other Universities of the U.S.A. are each in a position to offer two Travelling Fellowships to the junior teachers of Jadavpur College for three-year studies and work in American institutions. It should be worth while to start negotiations without delay. Jadavpur cannot have too many foreign-schooled and foreign-factoried teachers. (See pp. 183-187).

A Foreign Education Committee of the N.C.E. or, at any rate, of the Alumni Association is an immediate necessity. One of the functions of this Committee should be to explore the possibilities of utilizing American and other foreign educational and industrial facilities in the interest of Jadavpur teachers. Be it noted that the desired-for Committee has been recently established by the Alumni Association (November 17, 1945).

SECTION 3

*Twelve Dynamic Factors in the National Education Movement (1905-45)**

The national education movement is not very rich in creative personalities. The world might expect a larger number of energetic Bengalis at work in this field. On the other hand, the movement is not very poor either in the number of patriotic workers. By the Bengali, or for that matter, Indian standard, the N.C.E. and Jadavpur College have not failed to evoke the enthusiasm, patriotic sentiments and creativity of the Bengali people. The number of persons that have actively participated in the national education movement—the “key-men”—during forty years is somewhat mentionable. The analysis of the work of the N.C.E. from 1905 to 1945 should furnish inspiration to

* This section is to be read along with Section 1 (Creative Forces) and Part II (The Calendar of Jadavpur College in Evolution 1905-45).

fresh workers and idealists of Bengal in the fields of patriotic service.

Satish Mukerjee's Dawn Society Group was the first dynamic factor in the national education complex of 1905-10. The second dynamic factor was the Brajen Roychowdhury-Monmohan Bhattacharya-Ambika Utkal Group. Both these Groups were considerably enriched by the emergence of a third dynamic factor. This was the Aurobindo Ghosh-Subodh Mallik Group. The Gooroodas Banerjee-Hiren Datta-Ashu-Chowdhury-Rashbehari Ghosh-Abdul Rasul Group functioned in the socio-legal sphere and was of immense service to the other three, which furnished the fundamental creative and spiritual urges in the movement.

It should be emphasized that for the period 1905-10 there was a strong dynamic factor in the Society for the Promotion of Technical Education. The Tarak Palit-Nilratan Sarkar Group was an energetic and patriotic centre of those days with special interest in *mistrification* and industrialization. Although in socio-cultural and political contact with the previous four Groups, this Group maintained an organizational distinctness from them for some time.¹

It was not before 1921 that a really new impetus was received by the national education movement from the activities of Bengali patriots. This consisted in the princely donation made to the N.C.E. by Rashbehari Ghosh in his last will and testament. The Rashbehari endowment is by all means the fifth dynamic force in the history of national education. It does not happen to be associated with any living person. The

1 The activities and ideologies of Satish Mukerjee, Hiren Datta, Gooroodass Banerjee, Aurobindo Ghosh and other leaders mentioned here as well as on pp. 245-246 have been dealt with at some length in the two volumes of *Benoy Sarkarer Baithake* (Interviews with B.S., 1943-45) compiled by Haridas Mukerjee, Shib Datta, Hemen Sen, Kshiti Mukerjee, Subodh Ghoshal and Manmatha Sarkar.

dynamics in this instance is furnished by a name or rather a memory.

And yet it is relevant to think of certain persons too in this connection. The group of engineers that helped the N.C.E. in the matter of selecting the site (eventually Jadavpur) for the location of the College and erecting the buildings and preparing the grounds, lake, etc. rendered substantial service, as says the *Annual Report for 1919-21*. The engineers whose dynamic help was in evidence in connection with the first utilization of the Rashbehari endowment were Monmohan Ganguli, Abinash Chatterjee, Mahendra Datta, Dharani Bose and D.R. Vadgama. They may perhaps be regarded as the seventh Group. To this unit might be added the names of Nilratan Sarkar (medical practitioner) and A. C. Bentley, Director of Public Health, Government of Bengal, who helped the N.C.E. in regard to the sanitary planning of Jadavpur.

The eighth dynamic factor in the national education *Gestalt* is the Group of city-fathers who during 1927-33 were patriotic and idealistic enough to earmark a substantial part of the Calcutta Corporation's social service funds in behalf of Jadavpur College. The Corporation has certainly proved to be one of the greatest benefactors of the N.C.E., thanks to the *Swaraj* philosophy and "municipal socialism" of Chittaranjan Das, Jatin Sen-Gupta, Subhas Bose and Bidhan Roy.

It is possible to discover a ninth dynamic force in the N.C.E. This is the Alumni Association. The elders "Bar-das" or Big Brothers among its members constitute a mentionable Group, e.g., Hiralal Roy, Jatin Set, Satyananda Roy, Banesvar Dass, and Suren Roy. It is mainly through their organizing activities that the Corporation of Calcutta (1927-33), patriotic and educational-minded as it was, could get convinced of the valuable work done by Jadavpur College.

No less enterprising, patriotic and pushful is the younger batch of this Group. To this batch of "key-men" belong

Hem Guha, Sudhir Chakravarti, Gopal Sen, Kiron Roy, Sudhir Datta, Prafulla Banerjee, Sachin Saha, Atul Datta, Sasanka Bagchi, Sudeb Datta, Amar Haldar, Sachin Datta, Triguna Sen, Manmatha Chakravarti, Bankim Mitra, Susanta Chatterjee, Moni Majumdar, Bhupen Banerjee, Himangsu Sinha, Sisir Mitra and others. It is on account of their love of *Alma Mater* that Jadavpur College has been during the last seven or eight years (1937-45) exhibiting a *renaissance* in the industrial and socio-cultural world. Perhaps this second batch,—the younger alumni,—ought already to be treated as a new Group. This would then be the tenth Group of factors in the progress of Jadavpur College.

The Alumni Association is an organization of the "sons," so to say, of the dynamic Groups of 1905-10. Their occupations or professions are different, their experiences are different, their ideologies are different, nay, their very dreams are different, from those of their generators. But their creativities are of the same order, their ambitions are of the same order, their patriotisms are of the same order, nay, their spiritualities are essentially of the same order as those of the fathers of the Bengali revolution. It will be a glorious day for Bengal if and when in the near future, say, about 1950 the alumni of the N.C.E. can become its principal governors. The complete "alumnification" of the N.C.E. should be set as a goal of patriotic endeavours.

Perhaps it is worth while to notice that some dynamic persons are getting interested in the N.C.E.'s affairs from outside the ranks of the Alumni Association. Two of them may be singled out,—both engineers. They may be said to constitute a Group of independents, as it were, in technocratic management. One is Hari Bhaumik (Electrical Engineer) and the other Sachin Banerjee (Civil Engineer). Their contributions to the efficient management of Jadavpur College are likely to grow from more to more. This may be

taken to be the tenth or the eleventh (?) Group, if it can be called a group.

It should be observed that the city fathers of the Calcutta Corporation continue to maintain their active patronage of the N.C.E. Be it emphasized that the recurring Corporation grant of Rs. 30,000 p.a. is more substantial at the present moment than the total income actually accruing from the foundation-endowments of 1906. The city fathers as well as the members of the Alumni Association who have been in creative touch with them since 1927 are to be appraised as some of the greatest dynamic personalities. Perhaps the twelfth Group is to be seen in the Jadavpur-minded Council-lors of the Corporation.

This is an objective analysis of the past evolution of Jadavpur College from the standpoint of dynamic personalities. What is now wanted is the *élan de la vie* of new remakers of men, institutions and movements, determined to open a new chapter in the career of the N.C.E. The responsibilities of the men at the top consist, among other things, in discovering fresh dynamic forces. It is not enough to be able to manage somehow the three financial windfalls (like the grants from the Calcutta Corporation, the proceeds of the Rashbehari Endowment and the Brajen-Subodh zamindaris) as well as the fees derived from students.

Nor can it be a safe attitude to harp perpetually upon the spirituality, self-sacrifice and nationalist ideals of the fathers of the national education movement. The demands of the present are incessant and pressing. Spirituality, self-sacrifice and nationalist ideals were not the monopoly of those fathers. They are constantly in evidence among the public workers of today throughout India. Thanks to this progress in spirituality, self-sacrifice and nationalist ideals the N.C.E., as demonstrated by its objective history and statistical data, has not remained standstill in the grooves of

1906-10. It has been growing, moving and expanding,—especially since 1921,—along fresh fields and pastures new. It is with open and unclouded eyes that this evolution has need to be envisioned.

The *achalayatan* or the *status quo* mentality requires to be daringly demolished. The "new vistas" have to be enthusiastically explored, and—"another world beyond" to be courageously conquered. The Committees of the N.C.E. as well as the Alumni Association are called upon at the present moment to scout far and wide. The discovery of new energists and dare-devil enthusiasts,—new "key-men"—such as can be utilized by them in order to inject virility and venturesomeness into the habits and *mores* of themselves is the supreme necessity of the moment. In the interest of Greater Jadavpur the N.C.E. authorities have got to be doctored with a new spiritual tonic,—the tonic of creativity, explorations and pioneering. They will remain incapable of making any contributions to Jadavpur College unless they become thoroughly rejuvenated by this therapeutic.

CHAPTER II

"Futureward Ho!"

SECTION 1

Immediate Requirements

A large number of small items in the most diverse sectors of educational and industrial life will have to be taken care of in order to build up Greater Jadavpur. The immediate needs of the College and the N.C.E. are being envisaged by Young Jadavpur, the Alumni Association, and the authorities of the N.C.E. from many different angles. Plans for the future are plentiful on the Jadavpur Campus. Even among pessimists there prevails the consciousness of

“Futureward Ho !” Futurism pervades the atmosphere, and the name of reforms, reformers and reformistic programmes is legion. The re-making of Jadavpur has awakened the enthusiasm of all and sundry.

Improvements in Teaching : An electrical engineer of Jadavpur (1925), employed in the U.P., suggests the introduction of certain petty items in curriculum, e.g. the B.D.V. test of insulating materials.

According to an Instructor in Electrical Engineering who belongs to the 1943 class and is proceeding to England with a Government of India scholarship for communication-engineering, arrangements should be made for special papers in (1) power, (2) communications and electronics, (3) small machines, (4) measurements and (5) traction. He suggests that, if necessary, students with one special paper may be permitted to take a shorter course in certain subjects. Or a Master Degree course may be instituted with tuition for one year in any of the above subjects after the usual final examination. Another suggestion of his refers to the use of higher mathematical standards in the treatment of electrical problems. He recommends, for instance, the use of Bessel Functions, Fourier's Series, Operational Calculus, and Symmetrical Components.

A Lecturer suggests that arrangements should be made for more thorough and elaborate Laboratory work both in Mechanical Engineering and Mechanics.

A Jadavpurian (1923-27), now proprietor of an electrical business in Orissa, recommends the establishment of lecture programmes by successful businessmen from among the alumni. These lecture contacts are likely to awaken business interest among the students.

After retiring from Government service an American -schooled Jadavpurian has become the Director of Development and Industries in an Indian State. Some

of his suggestions are recorded below: (1) More time should be assigned for practical work, as has been done in the Chemical Technology courses of Bombay University. (2) It should be possible to cut down mathematics to half without affecting its usefulness to practical engineers. (3) The Alumni Association should have an Academic Committee for suggesting and advising the N.C.E. on courses of instruction from time to time.

A Jadavpurian (1925-28), employed as Auto-signal Maintainer in the G. I. P. Ry. at Bombay, says that items like house wiring, cable-joining, locating and rectifying faults on motors and dynamos etc. should be attended to in the practical training classes of Electrical Engineering. "These things are simple enough," says he, "and that is why they are neglected in the N.C.E. teaching, where much higher training is given. But a student who unfortunately is not very highly placed is likely to be called upon to rectify this kind of faults. If he feels diffident he brings disrepute to his *Alma Mater*."

He wants the authorities to consider whether it is not advisable to withhold the final certificate till the candidate has produced a six-months' apprenticeship certificate from a good Engineering Firm. Heads of Engineering Firms should be invited, he suggests, to give lectures on different subjects as often as possible." This, apart from improving the knowledge of the students, might help them in their after-life in securing jobs.

In the judgment of a Managing Director and Technical Director of firms who, besides, possesses an American Electrical Engineering degree, what is needed at present is "more space for teaching, more teachers, and more equipments." The needs of today are virtually identical, says he, with those of 1921-26 when he was a student of the Junior

Technical Department and the Electrical Engineering Department in the Senior Classes.

Complaints : In many of the replies to my *questionnaire* certain complaints occur very often.

The first complaint of an almost universal character is the holding of N.C.E. meetings outside the Jadavpur Campus. It has been the custom for a long time to hold the meetings of the Executive and other Committees in the houses or offices of the President, Secretary, Treasurer and so forth. Teachers and students have hardly had any chance of knowing the governors of the College even by sight. A situation like this is regretted because it leads to the humiliation of the College in the eyes of the public.

Another complaint runs to the effect that some of the financial endowments made by donors are endowments only in name. They do not happen to be donations at all. For years they have not yielded any income. On the contrary, they have been the sources of litigation and expenses as well as wastes of money on the part of the N.C.E. The management of some of the properties by the N.C.E.,—although advocate-ridden,—is suspected as having been rather careless and deficient.

A common complaint bears on the fact that extension and other culture lectures of the N.C.E. are not held on the Jadavpur Campus but in the halls of Calcutta. On account of this extra-mural lecture-system the N.C.E. is alleged to have been treating Young Jadavpur in a step-motherly way.

It seems that the first and the third complaints may be easily removed. For very many of the meetings of the Committees the houses of the governors do not necessarily have to be the venues. By 1950 not a single meeting of the N.C.E. ought to be held outside the Jadavpur Campus. Similarly there should not be any difficulty in organizing the public lectures within the College premises at Jadavpur. The

audience may turn out to be relatively small. But at any rate the academic tone of the College is bound to rise thereby. Even in Eur-America public lectures at Universities on cultural, academic or scientific topics are not often attended by hundreds.

As for the alleged mismanagement or careless handling of endowments, it is only lawyers who can argue with lawyers. But the authorities ought to try to remove public discontent in a satisfying manner. The *Annual Reports* should leave no vagueness in regard to the troubles with the income from the endowments. The scandal has been long-standing.

The annual income from the three zamindari endowments ought normally to be Rs. 30,850. But the actual realizations were Rs. 22,800 in 1939, Rs. 27,700 in 1940, Rs. 20,900 in 1941, Rs. 9,000 in 1942, Rs. 28,600 in 1943, and Rs. 18,600 in 1944. In six years the deficit in realization was registered by Rs. 57,500. Such arrears are, to say the least, quite regrettable.

Additional Establishments : An immediate and pressing necessity is the residential system. On account of the absence of Hostel accommodation non-Bengali students cannot take advantage of the facilities of Jadavpur College in large numbers. A Punjabi Jadavpurian (1929), proprietor of hosiery mills at Lahore, invites attention to this shortcoming with great emphasis. For Bengali students also the absence of adequate residential facilities is a great handicap. The loss of time due to travels between Calcutta and Jadavpur tells heavily against efficiency and harmonious combination in studies, workshop practice, sports, socials and public lectures. One of the greatest benefactors will be the person who gets several spacious Hostels built on the Campus. In order to request industrial magnates, the general public or the Government for students' dormitories one does not have

to be armed with the bombastic catchwords, "plan," "planning" and "planification." The need for Hostels can be felt by everybody.

"The establishment of classes in Conversational English as well as Commercial English is an urgent necessity if Jadavpur engineers are to shine in industrial business", says a German-factoried Jadavpurian of the Class 1930. According to him Jadavpurians, as a rule, seem to be lacking in self-confidence in spite of their skill and knowledge in engineering and technical subjects. He suggests that attempts should be made to introduce courses of general knowledge (outside of technical courses) as compulsory items for every student. "Not more than 50 or 60 students take part in sports on the Jadavpur Campus," says he, "Those few sportsmen happen to be smart-looking and competent enough to make a fine show in business interviews, social functions and public activities. But this is a negligible part of Young Jadavpur which is counted at nearly 1300. The College authorities ought to adopt measures by which self-confidence may be developed among the majority of the student population."

In the judgment of this Mechanical Engineer, who is an employee of the Supply Department and is to go in for the manufacture of machines in a short time, compulsory drill is likely to be very helpful in the straightening of the backs of our youngmen as well the development of disciplined habits and social virtues. Like many other Jadavpurians this one also feels that a College of Engineering cannot flourish unless the students are in residence at the College Hostels. Until the residential system be introduced for the thirteen hundred students he wishes canteens to be established on the Jadavpur Campus. Standard food at reasonable prices under medical advice ought to be provided by the authorities to nearly one thousand students every day. Three meals are

likely to be required daily in case the students are to spend eight to ten hours on the Campus in the interest of studies, workshops practice, extension lectures, physical exercise, sports and socials.

According to a Mechanical Engineer (1938), who is the manager of a metal working establishment, an Engineering Museum is a necessity of the College. It should be a permanent exhibition of tools, implements, instruments, machines, designs, drawings and so forth relating to modern technological, mining, metallurgical, pharmaceutical and other industrial establishments. A collection like this can be of immense help to the Third Year and Fourth Year students.

A foreign-trained Jadavpurian (1922-25), who is at present Professor at the College, wants immediately additions like the following: (1) more teachers, (2) more class rooms, (3) more laboratory and workshop equipments, (4) more library books, (5) more residential accommodation for teachers and students. In his judgment six of the best students of the College ought to be sent every year to foreign countries for further studies as prospective teachers. Intensive effort should be made to raise funds, says he. He is horrified at the lack of scruples, honesty and morals in some of the ex-students who are in business, and recommends compulsory attendance at the Religion Class on the part of every student.

Another foreign-experienced Professor suggests that a Royal Charter should be secured for the College in order to raise its social status and degrees to the level of those of Shibpur and Benares. He recommends the institution of travelling fellowships to be granted to professors for studies and investigations abroad once every five years. The Workshop and Laboratories have got to be furnished with

more modern equipment, and funds ought to be raised for that purpose.

French and German as Subjects of Instruction: For some time it should have appeared that a very immediate requirement of Jadavpur College is the provision for teaching French and German. One of these two languages ought to be offered as an optional subject by Final Class students of Mechanical, Electrical and Chemical Engineering. Those candidates who pass in French or German may be signalized with a star and provided with a special mention in the Bachelor's diploma awarded at the Annual Convocation.

The study of French and/or German ought likewise to be encouraged among the members of the teaching staff. A large number of the junior professors or instructors will have to be sent to the U.S.A., England, France, Sweden, Switzerland and elsewhere for doctorate in engineering as well as equipment with the latest foreign techno-industrial experiences. The knowledge of French and/or German should in such cases be regarded as an inevitable necessity. The establishment of a Department of Foreign Languages and Cultures ought to have been a *fait accompli*.

College of Applied Economics and Social Work: There is provision for Economics at Jadavpur College. But generally speaking, in an Engineering College Economics as a subject of instruction is likely to be at a discount. In connection with Greater Jadavpur be it therefore strongly emphasized that lectures on Economics should comprise at least four different topics. The first is industrial finance comprising banking and insurance as branches of capitalism. The second important topic ought to be business organization and industrial administration. Labour economics, factory legislation, and social work should be the third topic. Last but not least, balance sheets, accounts, costing, auditing and so forth ought to demand special attention. A work like

The Development of American Industries by Professor I. G. Glover and W. B. Cornell of New York University, adapted to Indian conditions, may be suggested as a compulsory introduction to the Economics course of Jadavpur College.

Engineering and industrial economics may indeed eventually grow into the nucleus of a separate College under the auspices of the N.C.E. In Calcutta there is yet nowhere an adequate provision for the teaching of applied economics. Efficient courses in banking, insurance, transportation, internal and foreign trade, marketing, commercial statistics, industrial management, labor organization, social work and allied topics deserve to be rendered more popular as subjects of instruction among the student population. In case the N.C.E. decides to revive the old Bengal National College it should be worth while to concentrate on Applied Economics and Social Work.

An ordinary College of Arts like Asutosh College or Vidyasagar College, affiliated to Calcutta University, may be started by other organizations. But it is by establishing a College of Applied Economics and Social Work that the N.C.E. can pioneer really new avenues to culture and humanism combined with material prosperity. Professors for these topics of economics should possess engineering degrees and/or experience in factorification. Such professors of economics are not available in India today and cannot be turned out by Indian Universities through their current courses of instruction in economics and commerce.

The re-making of Jadavpur will have to be undertaken simultaneously at several points. The Executive Committee and the Managing Committee will find it worth while to have these reform ideas examined by a special committee, such as is adequately conscious of the "new vistas" and "another life beyond." A Greater Jadavpur adapted to the new techno-industrial requirements of Young India may then

grow up as the result of co-operative thinking on futuristic lines. Many of the improvements and reforms suggested above may be taken in hand even on the strength of more or less the present resources.

There are certain larger considerations, especially those nation-wide in extent, which have direct bearings on the question of reconstructing Jadavpur or building up a Greater Jadavpur. To these let us address ourselves.

SECTION 2

The Assessment of Jadavpur College and Jadavpurians by the World-Standard

Towards the beginning of the present century not more than ten engineers used to be issued every year by the Government Engineering College at Shibpur¹. And even these few were civil engineers. The entire educational system in Bengal as in All-India was over-literary. Scientific bias was almost imperceptible. Mechanistic, technocratic, engineering, pharmaceutical and public health aspects were hardly even visualized. In the manufacture of tools, implements and machineries Young India was a whole encyclopaedia behind the rest of modernized mankind. The Indian people was kept by the powers that be at a scientific, technological and sanitary lag of seventy-five years, nay, almost a century *vis-à-vis* the progressive nations of the world.

It was against this lamentable lack of adequate modernization in science, industry, economy, expectation of life, public health, and general culture that the Bengali people

1 See the chapter on "Education and Research in Science" in B. K. Sarkar: *Creative India* (Lahore, 1937), pp. 611-643, as well as *Introduction to the Science of Education* (London 1913), and *Comparative Pedagogics in Relation to Public Finance and National Wealth* (Calcutta 1929).

protested and rose in revolt in 1905. One of the most substantial embodiments of that Bengali revolution,—the all-round *swadeshi* (national) movement,—has grown into what is at present the College of Engineering and Technology at Jadavpur near Calcutta. (See pp. 69-72).

In regard to Germany vanquished in World-War II (1939-45) the victors are perpetually harping on de-industrializing her, i.e., annihilating her techno-industrial might and potentialities both in material resources and man-power. They intend planfully to keep her at a semi-industrial and preponderantly agricultural level in a substantially backward condition *vis-à-vis* themselves. We are to understand that the creation of a backward and primitive people lagging behind giants out of a condition of go-ahead industrial power is a possibility. In regard to India today the student of comparative industrialism and technocracy may therefore reasonably believe that her relatively backward techno-industrial condition as well as socio-cultural lags have been brought about consciously and wilfully by the deliberate attempts on the part of the powers that be to prevent her from growing into a great techno-industrial giant.

Jadavpur College has sent out some three thousand engineers and chemists of diverse denominations in the course of its career. They are being utilized far and wide throughout India in positions of technical, industrial, scientific and commercial importance. Several hundred have found employment with the Tatas alone. Marwari and other Indian merchants and industrialists have likewise considered it worth their while to make use of the young men turned out of this institution. Jadavpurians, both Bengali and non-Bengali, have found recognition with "Big Business" under British auspices. A considerable part of the technical, industrial and export-import activities of the Bengali people is being manned by the mechanical, electrical and chemical

engineers of Jadavpur as founders, proprietors and managing directors as well as technical assistants.

The progress achieved by India in modern economy and sanitation up till now is too inadequate if we envisage the results of industrialization and economic modernization per head of population or per square mile of territory. In the field of industrial and engineering research, likewise, Indian achievements are juvenile. (Pp. 125-129, 145-147, 176-179, 198-203).

We have climbed a height indeed,
But, alas, the highest is yet to come !

The country has to be armed with a much larger number of engineers and chemists in order to cope with the requirements of higher standard in wealth and health, as well as scientific and research activity.

Like the schoolmaster the lawyer is a somewhat household word in India among the school-going and middle-class men and women. The medical doctor comes next to the lawyer as a popular category in the social economy of India. But as a professional category the engineer,—mechanical, electrical, chemical, mining, naval, agricultural, or sanitary—is hardly within the common cognizance of the *intelligentsia*. The engineer will have to become a more or less household word if the Indian people is to rise in the scale of technocracy, industrial power and social progress.

Inspite of the cumulative efforts of all and sundry, comprising as they do the impacts of two world-wars, India in technocracy, industrialism, research output, health condition, and social efficiency continues still to be almost where England, Germany, the U.S.A. and France were, say, between 1850 and 1870. The techno-economic and socio-scientific lag of virtually a century remains to be made up by the Indian people. Herculean efforts will have to be undertaken in the most diverse fields of education, science,

industry, "mistrification" (the training of intellectuals as *mistris* or technicians), "nursification" (the training of girls in social, work which may be generally described as nursing), public health, and general culture. The problem of catching up with the go-ahead nations is hardly a question of practical politics, because on account of the thousand and one inventions of technocracy and applications of new scientific discoveries during World-War II,—the last but not the least of which is perhaps the atomic bomb,—their economies, social organizations, and cultural systems are undergoing a thorough transformation such as may aptly be described as the second or rather the third industrial revolution. In India engineering and technology are still in their non-age so far as factual and institutional economic developments are concerned. The assessment of Jadavpur College and Jadavpurians is therefore bound to be modest by the world standard. (Pp. 179-187).

This situation offers a powerful challenge to Young Bengal, or for that matter, to Young India. We have to accept this challenge in right earnest and proceed goalfully towards a reasonably "Greater Jadavpur."

CHAPTER III

The Foundations of Greater Jadavpur

SECTION 1

The Techno-Scientific Educational Background for a Greater Jadavpur

The subject of social lags is of world-wide importance in the science of comparative culture-history. But it is particularly urgent in India on account of our specially backward conditions. In the interest of educational futurism or the cultural reconstruction of the country in the near future the

following observations are being made with reference to the new techno-scientific education such as is desirable as the background for a Greater Jadavpur.

1. The lag in the application of scientific knowledge to everyday life of the Indian people is to be envisaged as but an expression of the fundamental socio-cultural lag or distance of India from the go-ahead regions of the modern world.

2. India's chronological distance from these advanced regions is to be measured, generally speaking, by some three quarters of a century in the case of hyperdeveloped countries like England, Germany and the U.S.A. But in regard to the Balkanic and Slavic regions as well as some of the Latin American countries India's chronological lag is hardly palpable, as has been maintained in *The Equations of World-Economy* (Calcutta, 1943).

3. India's lag, distance or backwardness, such as it happens to be, cannot be overcome by educational or cultural agencies alone. Economo-technocratic developments and improvements in national finance are to be considered as some of the pre-conditions. No less value is to be attached to the effective elevation of the people in political status and ambitions such as can render Indian creativities fruitful on a mentionable scale. The remaking of society cannot be consummated exclusively by schools and colleges.

4. In so far as educational or cultural agencies alone are to be taken into consideration, the problem consists, other circumstances remaining the same, in inoculating the I.A. and B.A. curriculum of Indian Universities with doses of general training in the exact sciences and their practical applications.

5. A paper on general science will have to be made obligatory for every I.A. and B.A. student without consideration as to the other compulsory or optional papers. It is to be an additional paper for all.

6. This compulsory paper for all I.A. and B.A. candidates is to be a paper, generally speaking, on discoveries and inventions. The text-book recommended is to comprise lessons on the following topics : (a) mathematico-astronomical, (b) physico-chemical, (c) geographico-geological, (d) biologico-anthropological, (e) medico-sanitary, and (f) machineries, tools and implements.

7. The treatment of these lessons is to be unmathematical. The latest and most recent position in each science is to be indicated. But attention must be drawn to the evolution in each scientific doctrine and technological or engineering progress.

8. The text-book for B.A. is evidently to be somewhat more elaborate and comprehensive than that for I.A.

9. The suggestion may appear to be radical in the present state of education. It may involve several years of patient publicity work on the part of the Indian Science Congress and of its Social Relations Sub-committee (estd. 1940) in order that the serious attention of the Universities to the necessity and value of the measure advocated here may be adequately drawn.

10. The importance of the history of exact sciences and techno-industrial inventions as a compulsory subject of instruction for every M.A. and M.Sc. student of the Calcutta University has been discussed by me in the "Memorandum on Post-Graduate Studies" (*Calcutta Review*, for August 1926) available in my *Greetings to Young India* (Calcutta 1927).

These are some of the "new vistas" and traces of "another life beyond" for which we have to get ready. The educational system of the country requires to be reconstructed on this kind of scientific bias in order that the pedagogic foundations for a Greater Jadavpur College of Engineering and Technology may be laid. Unless the *milieu* of general

culture of the people be more "mistrified" and "nursified" as well as rendered more scientific and technocratic the urges for raising a high class College of Engineering and Technology still higher can hardly be available in the community. Even the governors and managing committees of the College are likely to feel complacent and sit tight on its past glories and the self-sacrifice of its pioneer workers. And of course the Government is likely to appraise this demand for Greater Jadavpur as much too above the requirements of the people in the near future. Evidently the problems discussed here can be solved only by the Department of Public Instruction or rather by the Calcutta University.

SECTION 2

Technical Education for Fifty Per Cent of the Student Population

Prominent educators and statesmen, both non-official and official, have propagated educational plans¹ for the three hundred and ninety millions of Indians. It does not belong to the scope of the present study to examine these plans or to discuss to what extent such subcontinental plans have a chance of being implemented in the immediate or near future. As long as Rs-annas-pies are not within sight, the so-called plans are to be appreciated as but essays written by academicians. The figures suggested in them have no more meaning than the exercises in multiplication given in a school-book of Arithmetic. Paper-plans are in the main valuable as contributions to philosophy. I wish to fight shy of making a plan

¹ *Post-War Educational Development in India*. Report by the Central Advisory Board of Education (Delhi) 1944. Adinath Sen: *Educational Reorganization in India* (Calcutta 1944) and *Technical Education* (Calcutta 1930).

even for the sixty millions of Bengali population. But in the atmosphere of Jadavpur College and Jadavpurians it would be quite relevant to observe that today there is need for a reorientation of the Bengali social mind and reconstruction of educational philosophy among the Bengali masses and classes.

"Mistrification" is at the present moment the most momentous necessity of Indian national culture. A net-work of technical schools ought to be established throughout the country. My slogan is as follows: Technical education for fifty per cent of the student population. In the interest of all-round or universal "*mistrification*" half the boys and girls in every school-seeking family have need to be sent to technical institutions of junior, intermediate or higher grade.

For the Pre-Matric standard, i.e., for boys and girls of the 14—16 age-group India ought to possess in every district at least one Technical School for boys and one Technical School for girls. These schools should roughly correspond to the *Ecoles pratiques de commerce et d'industrie* of France the *Fachschulen*, *Berufsschulen* and *Technikums* of Germany, or the *Technicums* of Soviet Russia. Not more than fifty per cent of the Matriculates should be allowed to go in for higher academic education. Technical schools ought to be provided for the remaining fifty per cent. In Calcutta, for instance, there ought to be available several Technical Colleges of the Post-Matric (I.Sc. and B. Sc.) standard both for boys and girls. I am not interested, for the present, in discussing how these institutions are to be named and how they are to be linked up with the Department of Public Instruction, the Department of Industries and Commerce, or the Universities of Calcutta and Dacca.

By technical education is meant, of course, education in the use of tools, implements, machineries etc. as well as chemicals, minerals and so forth. It is being used here, how-

ever, in a comprehensive and elastic sense. Agriculture, animal husbandry, dairy, forestry, commerce, banking, insurance, transportation, medicine, public health, labour welfare are all to be included in this category. With regard to girls technical education should comprise also such subjects as "social work" of diverse types, health welfare, clinical and laboratory assistance, nursing, as well as domestic science. In every modern-minded family at least half the girls should go in for such social, professional and other technical institutions. In a general manner "nursification" may be described as the aim of professional (technical) education for girls.

"Mistrification" for boys and "nursification" for girls are then the two wings of my fundamental slogan, concretely formulated, for educational planning and social reconstruction.

SECTION 3

Wanted Fifty Lakhs in Five Years for Jadavpur

In case the educational and cultural atmosphere of the people be enriched with such scientific schooling, "mistrification," "nursification," and a complex of techno-industrial, medical, professional, and social work schools, it would not be too much to demand that the highest Engineering Colleges of Bengal, namely, the ones at Jadavpur and Shibpur, should be expanded so as to make provision for at least three times the number of students accepted at present.

Pedagogically and socio-economically speaking, what the Bengali people really needs today is, again, among other things, at least four new Colleges of Engineering and Technology in the north, south, east and west of Bengal,—all of the Jadavpur standard,—the highest in India, which happens to be quite high by the Eur-American and Japanese standard. These new Jadavpurs or Shibpurs may be started

by the people, "Big Business," the Universities or the Government. The country's educational requirements demand these new Colleges of Engineering and Technology, no matter under what auspices. Further, Jadavpur College itself requires enlargements and improvements in equipment, *personnel*, and industrial research facilities. The creation of new departments at Jadavpur for aeronautics, automobile engineering, mining, radio, pharmacy, ceramics, and marine engineering is also a desideratum. It is easy to make a list of desiderata.

To come down to the realities from the realm of "pious wishes" let us have a bird's eye view of the financial position of Jadavpur College. We shall take a long-period survey. From 1925 to 1944, for twenty years, we get the following picture :

1. Annual Average of Students	...	718
2. Total Expenditure (with capital items)	...	Rs. 5,838,000
3. Annual average of 2.	...	Rs. 291,900
4. Total Capital Expenditure (Construction, Equipment and Library)		Rs. 623,000
5. Annual average of 4.	...	Rs. 31,150
6. <i>Per Capita</i> Expenditure <i>p.a.</i> (with capital items)	...	Rs. 407
7. <i>Per Capita</i> Expenditure <i>p.a.</i> (without capital items)	...	Rs. 363

We may summarize the results of diverse calculations for different periods in the following table :

Year	Annual Average of Students	Per Capita Expenditure <i>p.a.</i> (without capital items)	Per Capita Expenditure <i>p.a.</i> (with capital items)
1925-29	585	457	620
1930-39	585	358	363
1940-44	1188	303	324
1925-44	718	363	407

It is proper, then, to observe that during the two decades (1925-44), with or without windfalls, the *per capita* expenditure *p.a.* was nearly Rs. 400 for the annual average enrolment of some 700 students. The total expenditure in twenty years may be taken to have been Rs. 6,000,000 at the rate of Rs. 300,000 *p.a.* This statistical reality should function as an eye-opener.

On this positive basis what kind of Greater Jadavpur can we possibly think of in a somewhat reasonable manner? It would be but a crying for the moon if one were to dream of crores of Rupees for the establishment of a C.I.T. or M.I.T. of the American pattern right away at Jadavpur. Windfalls are certainly to be left out of the picture. The cry that I want to raise, for the time being, after nearly four decades of slow but steady and effective achievement is: Wanted Fifty Lakhs of Rupees (Rs. 5,000,000) in five years for Jadavpur College. This is the slogan that every alumnus of this institution ought to propagate each in his own sphere. This is the slogan that every Bengali, true to the ideas of 1905, ought to take upon himself or herself for fulfilment in the interest of the country's adequate technocratic and industrial uplift. This is the slogan to which "Big Business,"—British, Marwari, Parsi, Bhatia, Gujarati, and of course, Bengali,—ought to lend a sympathetic ear with a view to the proper realization of its own ends. The Tatas, the Birlas, the Ispahanis, the Burns, the "Clive Streets," the Dawoods, the Roys, the Laws,—all should come forward to "adopt" one or other department or section of this institution and render it an efficient instrument of modernized Indian economy and upto-date techno-industrial research.

Some of them may take upon themselves the responsibility of erecting several Hostels for, say, 500 boarders. Others may think of sending 20 junior professors of Jadavpur to the U.S.A., England, Switzerland, Sweden and France for

doctorate in engineering as well as factorification. The expenses are likely to be some Rs. 200,000.

SECTION 4

Initiations and Expansions vs. Abolitions and Retrenchments

While expatiating futuristically on the glories of Greater Jadavpur I have constantly before me the abolitions and retrenchments ideology of the Special Reorganization Committee and the Expert Committee instituted by the N.C.E. in 1939. (Pp. 57-58).

On the Bhaumik-Ganguli Report of July 1940, Vice-President Hiren Datta submitted a Note in which the recommendations were, among other things, for abolishing (1) the Department of Chemical Engineering, (2) the Department of Agriculture, (3) the Survey and Draftsmanship Course, and (4) the teaching of History. He was, besides, emphatic that "more sustained and organized propaganda might bring us some money but that would not be at all commensurate with our needs." "Let us do as much propaganda as possible," said he, "but I do not expect quick results." He suspected that unless "drastic steps" (retrenchments and abolitions) were taken "we should have to close down the College in the near future."

The Bhaumik-Ganguli Report itself was less pessimistic about the Chemical Engineering and Survey Courses or about the financial possibilities. It suggested that "substantial grants may be asked for from Government, but that vigorous and energetic action should be taken to give better publicity to this institution so that private endowments and donations may be forthcoming." "We dare say," the Report went on, "donations and endowments may be

procured if a suitable propaganda or publicity officer be appointed to explore fresh avenues for augmenting the income of this institution. We do not think Professors can seriously undertake such work in addition to their legitimate duties."

The more or less pessimistic atmosphere of 1940 was somewhat counteracted by the general inflationist ecology of the war-effort in subsequent years. The conditions were propitious for the Greater Jadavpur ideology with which the present author has been associated or identified for a long time.

Several Jadavpurians, employed as teachers at the College, have often suggested, like Engineers Bhaumik and Ganguli, the desirability of making intensive publicity in order to raise adequate funds from the business houses, public bodies and Government. While going through the Laboratories, Workshops and the Libraries, I have talked it over with some members of the teaching staff in regard to the sectors for immediate improvement and expansion or initiation. Conversations have been held likewise with several members of the Alumni Association. Contacts with industrialists and members of the Chambers of Commerce have also been suggestive in this connection. It appears that the requirements of Greater Jadavpur would demand of the Governing Body of this College very substantial funds for the following purposes :

- I. The opening of new Departments, such as
 - (i) Automobile Engineering, Aeronautics, Marine Engineering, etc.
 - (ii) Geology, Mining, Metallurgy, Ceramics, Pharmacy, Industrial Management, Applied Economics, etc.
- II. The improvement and uptodatization of existing Laboratories, Workshops and Libraries.
- III. The initiation of one Precision Machine-Shop.
- IV. The initiation of one Fine Mechanics Workshop.

V. The installation of several Research Laboratories, e.g.

1. Chemical
 - (i) Oils and Fats.
 - (ii) Electro-Chemical preparations.
 - (iii) Design of Chemical Engineering Appliances.
2. Mechanical
 - (i) Internal Combustion Engines.
 - (ii) Refrigeration & Air-Conditioning.
 - (iii) Materials.
 - (iv) Pumps & Agricultural Machinerys.
3. Electrical
 - (i) Design & Manufacture of Fractional H. P. & Small Motors.
 - (ii) Design & Manufacture of Lamps, Reflectors, Electrical Valves, etc.
 - (iii) Design & Manufacture of Measuring Instruments.

VI. The establishment of Hostels and Infirmarys, a Hall for Extension Lectures, as well as a Central Library.

VII. The establishment of an Engineering and Techno-Scientific Museum.

I am not burdening this book with financial estimates, item by item, of this Improvement and Expansion Plan for the College. The Professors in collaboration with the Alumni Association, many of whose members are manufacturers and importers, as well as critical-minded engineers like Hari Bhaumik and others can present such estimates at a moment's notice. I should only suggest that without reference to the initiation of new departments, the capital expenditure on the modernization of the existing Laboratories and Workshops and the erection of Class Rooms, Library and Reading Room, Hostels, Lecture-Hall, Infirmarys, and Restaurant, is likely to come up to Rs. 3,500,000. The annual recurring expenditure on the existing Departments, the Laboratories, the Workshops, the Library, etc. as well as on additional teachers,

the training of junior professors in foreign countries, and on increments in salary in accordance with a decent grading may be taken to be higher by Rs. 300,000. This is more or less the annual average of total expenditure from 1925 to 1944, as noted in Section 3. The capital and recurring expenses for entirely new Departments are being left out of consideration for the time being. (P. 278).

The sum of Rs. 3,500,000 for capital expenditure should not appear heavy to "Big Business" if it just decides to "adopt" this College as an integral part of large industrial establishments. Similarly the *additional* Rs. 300,000 p.a. or rather the *total* annual recurring expenditure of, say, Rs. 600,000 is too petty to be treated as a burden. This is why I have raised the cry for the modest sum of Rs. 5,000,000 (Fifty Lakhs) in five years for Jadavpur College. The Government of India in co-operation with the Government of Bengal can finance this suggested improvement in no time. The attention of individual philanthropists, educational benefactors, industrial magnates, social workers, and charity trusts is invited to this worthy object. They do not need to be told that with Rs. 10,000 it is possible to take charge of a junior professor's training abroad for doctorate in engineering and that a Hostel for 100 boarders can be built with a sum of nearly Rs. 200,000.

Be it remarked once more that in engineering and technology my knowledge is nil. As for mathematics, physics, chemistry, geology and biology it has never gone beyond the Intermediate Standard. I am incapable of making estimates for laboratories and workshops or of critically sitting in judgment on those made by professors of engineering. It is but a layman's analysis and survey that is being presented in this publication, as has been stated at the outset (P.6).

CHAPTER IV

The Students of Greater Jadavpur

SECTION I

Fifty-Day Factorification Per Year A Pedagogic Necessity

•I am neither an engineer nor a chemist. The present survey is a study by a layman. But contacts with engineers and chemists as well as industrialists, factory managers, technical experts, research promoters, and exponents of "managerial (technocratic) revolution" have been experienced by me off and on in Eur-America, Japan as well as in India. It appears to me, therefore, that College workshops and laboratories are not enough as training grounds for engineers and industrial chemists. In the interests of *mistrification* students of the College or University level have need to work as *mistris*, technicians, coolies, turners, fitters, foremen and what not in industrial establishments, mines, factories, railway works and such other engineering and chemical concerns as produce goods for the market. Jadavpur College does not yet provide for such work and experience on the part of its students in machine-building, chemical, pharmaceutical, metallurgical, mining, railway and other works. This is a shortcoming of which I have become painfully aware while going through the Laboratories and Workshops of the Jadavpur Campus.

It is the custom at Jadavpur as at many other Engineering Colleges for students to think of practical work in factories, if good luck prevails or circumstances permitting, after finishing the final examination and getting the degree. This tradition is to be subverted. It is to be replaced by the practice of students' work in factories,—factorification,—while they are still in tuition at College.

At least 50 days in the year ought to be devoted by every student to regular routine-work in an industrial business-concern. The two long vacations enjoyed by students should be ear-marked for this kind of compulsory labour in factories, mines and workshops. A factory term is in this manner to be sandwiched up in between two College terms every year for four years. Factorification should belong to the irreducible minimum of efficient instruction in engineering and technology.

The Executive Committee of the N.C.E. ought to be up and doing. It would involve at least three, five or seven years' publicity work and constant intercourse on their part with the leaders of "Big Business" in Bengal and outside. Of course, it is none but the largest mechanical, electrical, mining, metallurgical, pharmaceutical and chemical undertakings that can afford to make regular and systematic provision for dozens of apprentices (paid or unpaid) during certain seasons of the year. Jadavpur College will have to be "adopted" by such concerns as their own recruiting ground for trained engineers, *mistrified* managers, researchers or research directors. India does not know as yet of such contacts between "Big Business" and educational institutions on a mentionable scale.

In order to initiate such contacts between industry (or trade) and education Government, of course, can be of the greatest service. But in the meantime it is the function, responsibility and duty of the Governing Body of an educational institution to explore the avenues of *liaison* between the college and the factories. It is time for the Executive Committee of the N.C.E. in alliance with the energetic and forward-looking members of the Alumni Association to adopt every measure by which 50-day factorification per year can be rendered compulsory for every student of Jadavpur College.

Occasional excursions to mines, factories and workshops

are good so far as they go. I am here speaking of an entirely new orientation in regard to education in engineering and technology. The factory, the mine or the workshop is to be regarded as an educational institution of the same, if not greater, value as the College itself. No student can be permitted to sit for the degree examination in M.E., E.E. or Ch.E. unless he has completed his 50-day factory work per year for four years. This is the principle that has got to be recognized as the pedagogic minimum in every programme of techno-industrial education.

The Tatas have been very friendly to the N.C.E. since the beginnings in many ways. The question of making provision for the students of Jadavpur as regular apprentices during the academic period of tuition does not appear to have been broached to them by the authorities of the N.C.E. The question has to be taken up with Birla, Burns, Bata, Balmer Lawrie, Clive, Dawood, Electric, Gas, Imperial Chemical, Jardine Skinner, Martin, Premchand, Railway, Tramway and other companies as well.

SECTION 2

"Big Business" and Young Jadavpur

Jadavpur College is one of the recruiting grounds of "Big Business" for foremen, engineers, chemists, workshop managers, technologists, and researchers. It is the interest, therefore, of large industrial establishments to see to it that the College Laboratories and Workshops be adequately equipped and the teaching *corps* efficiently manned. The progress of the College along all fronts from triennium to triennium *en rapport* with the changes brought about by inventions and new processes in industrial technique as well as business management should be one of the chief concerns of the General Managers, Managing Directors and Technical Advisers of giant and middling industries. The "adop-

tion" of Jadavpur College by Big Business as one of its feeders belongs naturally to the most modernistic ideology in factory organization and industrial statesmanship. It goes without saying that the regular and systematic financing of one or other Department of the College by the Tatas, Birds, Birlas, Burns, Dunlops, Ispahanis, Jessops, Surajmulls, Martins, Skinners, Swaikas, Bhattacharyas, Dattas, Laws, Roys and so forth may be expected as a normal item in the business administration of today and tomorrow.

Secondly, in regard to the improvement and up-to-dating of teaching, Young Jadavpur should be provided with regular and systematic facilities for factory-work as *mistris* or technicians by the directors of large industrial establishments. *Mistri-mindedness* is an absolute necessity for Jadavpur boys. The fifty-day factorification per year for every student has been suggested by me as an indispensable item in the programme of adequate *mistrification* and *mistri-mindedness* among scholars. It is one of the responsibilities of Big Business in its own interest to earmark a part of its administration, finance, appliances, shop-personnel, and other facilities in order to equip the Jadavpur boys with practical training as limbs in the system of production. (P. 284).

In this connection may be reported the observations of Sj. Satya Prasanna Sen, General Manager of the Bengal Chemical and Pharmaceutical Works Ltd., on the eve of his departure for England and the U.S.A. as a member of the All-India Chemical Manufacturers' Association. At a farewell party presided over by the present author held at Bose Park, Calcutta (25 September 1945) Sen replied in part as follows in connection with the suggestion made above: "Very often," said he, "the student-apprentices behave like clerical employees. Their interest in technical work begins to fade with the second or the third week. The techno-

scientific *mistris* of whom you are speaking may not be undesirable in industrial concerns. But before the directors can assume the responsibility of making provision for the guidance and training of such scholars they expect a guarantee from the College that the trainees would behave as technically orientated, *mistri*-minded and otherwise worthwhile apprentices. Students must have the sense of responsibility for their own technical future and appreciate the services rendered to them by the Company. Our personal experiences with student-apprentices have often been unpleasant." The report of the American authorities about the paid apprentices at the "Blue Earth" workshops (Kidderpore) is, again, anything but favourable, as we understand from the Principal, Dr. Triguna Sen.

This situation deserves the serious consideration of the N.C.E. and Jadavpur College as well as the Alumni Association. The experiences of other Bengali industrialists, say, Hemen Datta, Sachin Bhattacharya, Deben Chowdhury, Alamohan Dass, Naren Law, Gangadhar Banerjee, Romen Roy, Naren Datta, Suren Roy, Satya Deb, Binod Mukerjee, Sudhir Nawn, Suren Bose, Khagen Das-Gupta, Kshitish Biswas and so forth in regard to their contacts with student-apprentices will be equally valuable as a starting-point for the new movement that is being suggested. It is time for the N.C.E. to come into *liaison* with the representatives of Big Business, both Bengali and non-Bengali, comprising Eur-American, and establish a platform on which co-operation may be possible between Young Jadavpur as *mistri*-minded students of engineering and the Managers of large manufacturing establishments. The responsibilities of Big Business have to be met half way by the genuine *mistri*-mindedness of Young Jadavpur.

In the third place, it is but a normal expectation that Big Business should admit the students and professors of

Jadavpur College to the mines, works, factories, mills, stores, and shops etc. as occasional visitors for techno-scientific purposes. The responsibilities of the Managers and Directors in this line are not great. But Big Business is known very often to have declined to admit such visits. This kind of non-co-operation on the part of Big Business should be a thing of the past.

In Appendix it has been exhibited the present position of Big Business in co-operation with Jadavpur College.

CHAPTER V

The Teaching Staff of Greater Jadavpur SECTION 1

Two-thirds of the Teaching Personnel to Possess Foreign Training

I am not a qualified man. Nor do I understand engineering and technology. It is not for me to sit in judgment on the qualifications of teachers of Jadavpur College. But like every other man of common sense it is possible for me to see the qualifications of others with naked eyes. In the interest of Greater Jadavpur it is desirable to examine these qualifications.

We have noticed above that 18 out of the 76 members of the teaching corps (say, 24 per cent) possess Eur-American training. This number and percentage are not bad, but they are not enough for a first-class teaching institution, especially for a College of Engineering and Technology. (Pp. 24-26).

Engineering is a growing science. Most of the growth has been taking place in Eur-America and Japan. In order to be really competent to teach different branches of engineering one should therefore have command of foreign academic qualifications in engineering as well as foreign factory

experience in techno-industrial establishments. For Jadavpur College the norm should be set by the following slogan: Not less than 66 per cent or two-thirds of the teaching staff to possess foreign (Eur-American or Japanese) training. Besides, Doctors of engineering or science should form 33 per cent. Just at present they are hardly 7 per cent.

From the present level this norm exhibits much too high and unrealizable an ideal. Perhaps, for immediate realization, i.e. achievement within, say, three years the general target may be set at one-third or 33 per cent. The suggestion is being made to the effect that in the course of 3 years the number of foreign-schooled and foreign-factoried teachers should be raised from 18 to 25. Funds should be rendered available for the despatch of eight Instructors, Lecturers or Professors of Jadavpur College to America, England, France, Sweden, and Switzerland for University (or *Technische Hochschule*) training as well as *mistrification* in manufacturing and technological establishments. (P. 266).

During three years the number of Doctors of Engineering or Science should be raised to 10 from the present 5. This would make 14 per cent *en route* to the goal of 33 per cent. The sturdy Jadavpurians of the Alumni Association ought to take this up in right earnest. By arranging to send Gopal Sen, Instructor of M.E. Department, to the U.S.A. with a travelling fellowship they have broken the ice. They have now but to establish a tradition.

A general principle in regard to the improvement of the qualifications of teachers may be enunciated here. Jadavpur qualifications and/or Calcutta University qualifications,—dependable as they happen to be,—are naturally to constitute the basis of employment as teachers. The teacher-employees are expected and ought to be encouraged to pick up some factory experience, however crude and modest, at their own initiative, in or around Calcutta or elsewhere

according to convenience. But by the third, fourth or fifth year of employment as teacher every member of the staff should expect to be sent out to foreign countries for higher academic education in engineering as well as factory experience in industries. It may be suggested that the N.C.E. ought to have never less than three members of the Jadavpur staff every year in Eur-America and Japan, as student, researcher, *mistri*, or industrial tourist. A special fund ought to be instituted for this purpose.

Some of the Engineering Colleges, Institutions of Technology, and industrial concerns of the United States ought to be approached in order that they may come forward with annual travelling fellowships, research scholarships, and so forth for Jadavpur teachers. This is another way in which Jadavpur College may be "adopted" by American educators and business interests. On account of their increasing export-import relations with India they are getting more and more India-minded. The Watumull Fellowships, established in California during 1945 for All-India scholars, have been started magnificently. A Jadavpur engineer, Amiya Chatterjee, has proceeded to Cornell on one of these fellowships. During 1929-39 such Fellowships were available from Germany's *Deutsche Akademie* (Munich). Dr. Tarak Das of New York who has experience of both the *Deutsche Akademie* and Watumull stipends and scholarships can be of substantial help to the N.C.E. in regard to the placing of Jadavpur teachers in foreign Universities and factories.

The Silver Jubilee of the Alumni Association is going to be celebrated in 1946. This year they ought to signalize by despatching seven more junior teachers to foreign countries. It may be possible for them to get the financial co-operation of American educational institutions and industrial organizations in case a Foreign Education Committee of the Alumni

Association commence establishing *liaison* with the U.S.A. A Committee on the lines suggested has been functioning since 17 November 1945. (Appendix I, No. VII).

SECTION 2

Research in Engineering and Technology

It is palpable to every observer that the N.C.E. is too poor to think of research, investigation, invention and discovery as items to be promoted at Jadavpur College. Engineering researches, technical inventions, scientific investigations, etc., do not, therefore, belong to the categories of Jadavpur teachers. The research output of the teaching corps is, on the whole, small, if not negligible. The exceptions are very few. Research is, therefore, at a discount, nay, almost a *tabu* in the ecology of Young Jadavpur as well as the Alumni Association. This is a regrettable situation.

It so happens that the most prominent researcher of Jadavpur is a mathematician (Professor Satis Chakravarti). Humanly speaking, mathematics is likely to be treated as a subsidiary subject by students and teachers of engineering as well as professional engineers and industrialists. The mathematical researcher cannot, therefore, feel comfortable in an atmosphere of official or collegial indifference, if not positive antipathy and discouragement from the administrators and teaching personnel.

This situation is in need of a radical change, if Greater Jadavpur is to be built up. Industrial research, scientific investigation, technological discoveries, and engineering experiments have need to be deliberately promoted and financed by the N.C.E. The Jadavpur Campus ought to be known in India and abroad as the foster-ground of inventions and discoveries, investigations and researches.

One of the methods by which this ideal or programme may be implemented is the introduction of a special condition while giving employment to new teachers. Every new teacher-employee ought to know that engineering and scientific researches are expected of him as a member of the teaching *personnel*. Naturally, the N.C.E. will have to furnish the sinews of war. The details may be worked out by a sub-committee of experts. I am throwing out a challenge to the younger members of the Alumni Association. Let them accept this challenge and rise to the occasion of writing or starting a new chapter of extreme importance in the history of their *Alma Mater*.

SECTION 3

Jadavpur College and the Indian Science Congress

The contacts of Jadavpur College with the Indian Science Congress deserve to be noted. They started with Professor Banesvar Dass's attendance at the session at Benares in January 1925 where he read his paper on "Food Products Rich in Vitamines" and at the session at Lahore (1927) where he presented his paper on the "Prospects of Oil Industry in India." Jadavpur College was thereby brought into scientific *liaison* with Bengali chemists like Hemen Sen, Jnan Mukerjee, Jnan Ghosh (Dacca) and Prafulla Mitra, and physicists like Deben Ghosh and Meghnad Saha (Allahabad), as well as chemists and botanists of All-India. The chemistry contacts were kept up at Madras (1929) by Professor Hiralal Roy with his paper entitled "Evaporation of Liquids in Still Air." In 1928 Professor Satis Chakravarti attended the session at Calcutta with a paper on "A Factorable Continuant." Chakravarti has attended or sent papers to seven or

eight other sessions. Jadavpur College officially or socially took part in the sessions at Calcutta in 1928, 1935 and 1938 (the Jubilee Year of the Indian Science Congress). Some Professors are reported to have participated in the deliberations. For the 1944 session at Delhi Professor Hirala Roy was the Recorder of the Section on Engineering and Metallurgy, a section established in 1941. In the session at Bangalore in January 1946 he led the discussion on the standardization of weights, measures and coinage with special reference to decimalization.

The intercourse of the Jadavpur teaching personnel with the All-India men of science ought to be planfully promoted by the N.C.E. with the provision of research facilities in the College Laboratories and Workshops. Encouragement should likewise be offered to them to attend the sessions of the Indian Science Congress and read papers at the Sectional Meetings. Jadavpur College can touch the Science Congress at diverse points because it has Sections on Mathematics, Physics, Chemistry, Geology, Agricultural Sciences, as well as Engineering and Metallurgy. No Session of the Indian Science Congress ought to function without Jadavpur scientists, engineers and technologists taking some active part in it. It is an item for the Executive Committee and the Managing Committee and the Alumni Association to ponder over.

Just at present a few professors like the ones mentioned above as well as Manmatha Chakravarti, Triguna Sen, Suren Roy, and Shiva Deb happen to be members of the Indian Science Congress Association. This is not enough. Active participation implies presentation of papers for reading, discussion and publication at as many sessions as possible, *i.e.* almost every year. Satis Chakravarti has set the example at Jadavpur.

International Science Congresses have been during the

last two decades or so getting Indianized to a certain extent. Indian scientists have joined these sessions as delegates and taken part in the discussions. Papers by Indian scientists have likewise been becoming a mentionable feature of these sessions as publications of delegates. The active participation of Jadavpur College in International Science Congresses ought therefore to be one of the concerns of the N.C.E. and the Alumni Association. Professor Jatin Bose's paper on "Power Development in India" was published in the Proceedings of the World-Power Conference at Berlin (1930). Such scientific participations deserve encouragement in a systematic and goalful manner.

CHAPTER VI

New Vistas and "Another Life Beyond"

SECTION 1

Jadavpur visàvis the Proposed Central Institute of Technology

Among the many post-war projects of war-time speculations is to be found the idea of an All-India Central Institute of Technology under the auspices of the Government of India. This belongs to the "new vistas" and "another life beyond." An institution of this type is certainly a desideratum. If and when established, it should be capable of meeting a profound educational and industrial need.

From the viewpoint of Jadavpur College, or even from that of Greater Jadavpur for which Young Bengal is being encouraged to be up and doing, the All-India Central Institute should have to be regarded as, in the main, but another College of Engineering and Technology located somewhere in India, and most probably outside of Bengal. The

Indian people, numbered at nearly four hundred millions, can afford to have dozens of Jadavpur or the proposed Central Institute. Neither the U.K., Germany, France, Japan, or Soviet Russia nor the U.S.A. has been able to do justice to its requirements on the strength of a single Central Institute, howsoever large and "polygonal" it be. The techno-industrial problems of the sixty millions of Bengali people alone demand, as we have already remarked, at least four new Jadavpurs in the near future. For all practical purposes, therefore, Bengalis can hardly be touched in a substantial manner by the establishment of an All-Indian Institute of Technology, say, at Delhi, Cawnpore, Jubbulpore, Bombay, Bangalore or even Calcutta. (P. 276-278).

A Central Institute like this can at best accept 20-30 per cent of its students from the Bengali sector of Indian population. In accordance with the demographic proportion (60 out of 390 millions) the quota for Bengal cannot evidently be more than 16 per cent. In case the Institute be equipped with a view to accommodate, say, 3000 students Bengal can not possibly expect to send more than 550-600. Jadavpur College is at present providing education in engineering and technology to some 1250. Of these nearly 750-800 are post-I.Sc. students in the four-year courses. They are studying higher engineering of the standard as offered at the highest Colleges of Engineering and Technology in Eur-America and Japan. Be it noted *en passant*, as has already appeared in other contexts, that Jadavpur is not exclusively for Bengali students. Many non-Bengali youths have every year taken advantage of this College. (P. 205).

There might be the possibility of migration of a part of these 750-800 students to the Central Institute. That eventuality may not be prejudicial to Jadavpur, because the demand among Bengali young men for education in *mistrification*, industrialism, and economic modernization is

tending to increase. The supply of students for Jadavpur is to be taken not as a constant but as an increasing phenomenon. In the post-war demobilization and depression (1946-50) there may happen to a temporary falling off in numbers. But in the long run, *i.e.*, in the course of a decade the curve is definitely in for the upswing. Nobody can ignore the reality that World-War III is already in preparation. The urges for techno-industrial education are tending to be steadily on the increase. The Central Institute should not therefore be appraised as in any way rival to Jadavpur.

In case the Central Institute be organized with the object, in part, of furnishing post-graduate instruction and research in engineering and technology Jadavpur College has everything to gain thereby. The more ambitious among Jadavpurian Bachelors of M.E., E.E. and Ch.E. will be in a position to proceed up to it for doctorate or research in engineering. Evidently the number of such post-graduate scholars for doctorate or research is not likely to be large. Even in Eur-America and Japan such scholars are to be counted at fingers' ends. In any case the provision of post-graduate teaching and research in engineering and technology is well calculated to furnish a spur to the activities at Jadavpur. By all means this indication of "another life beyond" is to be welcome on every hand.

Altogether, the talk of a Central Institute to be sponsored by the Government of India should encourage the N.C.E. and the Alumni Association to adopt measures for the remaking of Jadavpur College on improved foundations and the establishment of a Greater Jadavpur. It cannot be the function or aim of the Central Institute to kill off Jadavpur, Shibpur or any of the other existing Colleges of Higher Engineering and Technology in India.

SECTION 2

The Glib Talk of an "Indian M.I.T."

There is a glib talk in India today about the desirability or necessity of an M.I.T. (Massachusetts Institute of Technology). The suggestion should appear to be much too naïve, to say the least. India is not an independent sovereign country of the U.S.A. category. Nor does the Indian people possess giant manufacturing establishments, financial trusts, or commercial corporations like the American people. Then again, the Universities of Calcutta, Bombay, Madras, etc., are neither in financial strength nor in research output or even in the number of students and professors anything near Columbia, Harvard, Chicago, Michigan and other American Universities. These are too well known facts to be mentioned in a special manner. It is nothing short of hallucination to imagine, or senseless verbosity to broadcast from Imperial heights, that a C.I.T. (California Institute of Technology or Carnegie Institute of Technology) or an M.I.T. is a question of practical politics within Indian boundaries.

One wonders if in certain circles people believe that by paying Rs. 3,000 per month each to several Professors,—imported perhaps from abroad,—they can compel the world to believe that outstanding geniuses are at work on the College Campus. Or perhaps certain mentalities are used to associating high-class educational institutions with imposing brick-and-mortar edifices or marble-and-glass palaces as well as costly apparatuses or other externals and furnitures. May be, they imagine that if the gate-keepers, bearers, and scavengers ceremoniously *salaam* the professors while entering the Campus in their ten-thousand Rupee motor cars the atmosphere of an M.I.T. can be automatically engendered. The fallacy lies on the surface. Indian intelligentsia are not stupid enough to be

bamboozled by such bombastic expressions as an "Indian M.I.T."

But, on the other hand, the highest grade Engineering and Technology Institutes of India like Jadavpur College have each been functioning as an M.I.T. or C.I.T. in a fundamental pedagogic sense. What is an M.I.T.? Let us be clear about its contents. The students who join Jadavpur are generally 17-18 years old. Academically, most of them have passed the Intermediate Examination in Science of Calcutta or other Indian Universities. Very many of them are B.Sc's. The entrance requirements at American Universities and C.I.T., M.I.T. or other Technology Institutes are thus not higher than those at Jadavpur. Then, again, Young Jadavpur has to spend four years in tuition before maturing for the final Bachelor degree (B.M.E., B.E.E. or B.Ch.E.) examination. The M.I.T. youngsters do not have to do anything different or higher for their B.Sc.

Last but not least, Jadavpurians who pass the final examination after the four-year schooling, *i.e.*, Jadavpur graduates are admitted to "post-graduate" classes by Imperial College of Science and Technology (London) and to the corresponding "Graduate Schools" by Cornell and Michigan Universities as well as by the Carnegie Institute (Pittsburg) and the M.I.T. itself. The Jadavpur standard is then, pragmatically speaking, on a par with the M.I.T. standard. Jadavpur College is in educational essentials already to be appraised as an Indian M.I.T. *

Palaces do not evidently constitute the worth of an educational institution. Nor do high salaries of the American level indicate the superior scientific qualifications of the teaching staff. Modest buildings and low salaries have not prevented the Jadavpur Campus from turning out Engineering and Technology graduates of the M.I.T. stamp.

The academic and factory experiences of the teaching

corps at Jadavpur may also be analyzed. We have already drawn attention to the fact that of the 76 teachers 18 possess foreign (American, British, French and German) qualifications. Five of them are Doctors of Engineering or Science. It is to be observed that neither in the U.S.A. nor in the U.K. are Doctors of Science or Engineering plentiful as black-berries among the teachers of Engineering and Technological Institutes. Most of the teaching *personnel* in American and British institutions of higher engineering are B.Sc's. Thus considered, the Jadavpur staff with 24 per cent as foreign-educated, *i.e.*, possessing Eur-American B.Sc. or Doctorate, is quite a worthwhile teaching *corps* by the world-standard. Only, none of them enjoys the Rs. 1,500-3,000 per month salary, if that salary is to be the test of an Indian M.I.T. Professor. (Pp. 25, 288-289).

Evidently, room for improvement at Jadavpur is immense. The number of foreign-educated professors has got to be increased. The target has been suggested to be 66 per cent. The number of Doctors of Engineering or Science will likewise have to be raised to 33 per cent from the present low level of 7 per cent. Provision has to be made for the prosecution of researches and investigations as well as the study of French and German languages. Then there are numerous laboratory improvements and structural additions about which there can be no question, as has been indicated in a previous context. (Pp. 281, 290).

While making plans for Greater Jadavpur the N.C.E. and the Alumni Association ought therefore to avoid high-sounding slogans or meaningless analogies. They should go to business in a de-bamboozled and thoroughly realistic manner. Jadavpur College,—the existing Indian M.I.T. of today,—can become a more efficient M.I.T. in case a few million Rupees can be spent within five years. Let the M.I.T.-wallahs, both official and non-official, ponder over this reality.

The modest demand for Rs. 5,000,000 has been before them for some long time in the interest of Greater Jadavpur.

SECTION 3

Development Department of the N.C.E. a Desideratum

According to one of the oldest alumni, "tuition fees and Corporation grant may be considered as stable sources of income, and 50% of the average dividends and interests from shares, and securities for the last ten years can be safely regarded as another item of stability." "Experience shows", says he, "that continuous litigation has brought down the income from zamindari (real estate) endowments to a low level." He observes, further, that he does not minimize the value of "occasional help or grant from benevolent individuals." "But I urge," says he, "upon securing certain and stable grants, donations and subscriptions for adequate financial backing."

Ideas like this are not new or exceptional on the Jadavpur Campus. The question for the Executive Committee is the manner in which they can be carried out. In the course of forty years since 1905 no attempts appear to have been made for regularly tapping the financial resources of patriotic or business-minded people and organizing the "sinews of war". The finances of the N.C.E. have depended in the main on windfalls.

Today a new orientation is necessary if Greater Jadavpur is to be actualized in the near future as an item of educational planning. The raising of funds for the N.C.E. will have to be treated as a business proposition. Promoters or Directors of joint stock companies, as many of the members of the N.C.E. and the Alumni Association happen to be, need not be told about the methods and expenses of company pro-

motion. A part of the capital to be raised must have to be regarded as its price, *i.e.*, the cost of collecting it. And that price or cost has got to be borne in advance. For an educational institution which is bent on raising, say, fifty lakhs in five years perhaps one-tenth, *i.e.*, five lakhs may have to be ear-marked as promotion or collection expenses. The fees or salaries of the promoters, development officers, collectors, or financial agents, and other expenses relating to travel, publicity, literature, conferences, journalism, advertisement and so forth should all be treated as constituting the disbursements of the Promotion, Information, Development and Propaganda Department of the N.C.E.

In case the business sense of the N.C.E. be prepared to spend Rs. 500,000 in five years on organized publicity it may not be impossible to raise Rs. 5,000,000, thereby making a net collection of Rs. 4,500,000. Whether it is psychosocially possible for the N.C.E. or the Alumni Association to visualize this "another world beyond" as something solid and tangible is a different question. But the presence of a new vista is undoubtedly. It is perhaps the creative enthusiasm of individual patriots or financiers that can rise to the height of the occasion and tackle the problem of spending five lakhs in five years.

The method of estimating as indicated above does not take windfalls into consideration. The target proposed is not large,—only Rs. 50 lakhs. The expenses suggested should appear to be rather high,—Rs. 5 lakhs, and the period of time taken for the realization of the scheme quite long,—5 years. The whole complex is definitely orientated to Hiren Datta's warning against expecting "quick results" and money "commensurate with our needs." It takes cognizance also of the fact that the next quinquennium (1946-50) is a period of post-war demobilization, *i.e.*, of deflation and depression. All told, the N.C.E. may be advised to accept the universal suggestions of the teaching corps and the Bhaumik-Ganguli

Report and think of embarking on a money-raising campaign in a planned and goaful manner. A Development Department of the N.C.E. is a desideratum of the hour. And it should be a permanent fixture of the Jadavpur Campus.

Every year since 1906-08 the *Annual Report* of the N.C.E. has concluded with an appeal like the following : "The Committee appeals to all lovers of National Education and well-wishers of the country to place adequate funds at the disposal of the Council." It is now high time for the N.C.E. after forty years of these formal and unreal appeals to examine which members of the diverse Committees (outside the Alumni Association) have moved about in order to foster a love of National Education among our countrymen. It should be equally worth while to ascertain if the N.C.E. or any of its Committees have ever cared to create the interest of the "well-wishers of the country" in Jadavpur College and inspire them "to place adequate funds at the disposal of the Council." Sympathy and support have to be begged for, canvassed and sedulously sought. They do not come of themselves and meet anybody halfway. The authorities of the N.C.E. are finally on trial. The propaganda services of Asutosh Mukerjee for the Post-Graduate Department of Calcutta University and of Madan Mohan Malaviya for the Benares Hindu University remain yet to be sincerely recognized and seriously followed by the N.C.E. as living examples of cultural and educational patriotism.

SECTION 4

Degrees Honoris Causa

In the atmosphere of Greater Jadavpur may be discussed the question of exhibiting gratefulness to the sincere servants of the "national education" movement and genuine benefactors of the College. One of the methods is the conferment of honorary degrees or degrees *honoris causa* (Bachelorship or

Doctorate) on patriotic workers for their contributions to the progress of the N.C.E. For an engineering college the most suitable degrees *h.c.* are those for engineering, technology, science, education and economics. It should be observed that honorary degrees are marks, generally speaking, of recognition for social service. They are not necessarily indices to the honoured person's scientific or academic qualifications.

• An honorary Doctor of Law (L.L.D. *h.c.*) is not invariably a legal practitioner or a jurist. Similarly a Ph.D. *h.c.* does not have to be a professor of philosophy or writer on philosophical topics. The chief or rather the only consideration is the person's past contributions of an effective character, —financial or otherwise,—to the improvement and efficiency of the educational institution. It is generally on such considerations that degrees *h.c.* are conferred by the Universities and Technological Institutes of Eur-America and Japan on their benefactors, indigenous or foreign.

It may be observed that men like Satis Mukerjee, Aurobindo Ghosh and Brajen Roy-Chowdhury ought to have been signalized long ago by Hony. Doctorate in Education (Dr. Ed. *h.c.*). The N.C.E. would have served but to honour themselves by conferring this title on three such benefactors and founders or fathers of the national education movement. An action like this on the part of the N.C.E. is likely to have some educative or inspirational value on generous-minded industrialists, businessmen and educators, both Indian and foreign. They may feel inclined to come forward with donations or endowments to the tune of, say, five lakhs of Rupees (Rs. 500,000) or more. Such benefactions,—no matter by whom,—should lead eventually to an Hony. Doctorate in engineering (Dr. Eng. *h.c.*), science (Dr. Sc. *h.c.*), education (Dr. Ed. *h.c.*) etc. Those who do not happen to be financial magnates may be singled out for doctorate,—on account exclusively of their substan-

tial and well-established services to the N.C.E. and Jadavpur College, without reference to monetary and material contributions.

Certain alumni have started on the career of benefactions to their *Alma Mater*. Perhaps they may feel inspired to gradually raise the total amount of their donations until in the course of a few years the gift amounts to a' lakh (Rs. 100,000). On this basis a Jadavpurian Bachelor of Engineering may in the long run be deemed worthy of a Dr. Eng. *h.c.* That would be a decent satisfaction of a noble ambition. Rivalry is desirable among Jadavpurians for this honour.

Then there may be some Jadavpurians who failed to complete their course or satisfy the examination requirements as students at College. But perhaps they have distinguished themselves in industry or commerce. They may happen to be generously inclined to their *Alma Mater* and commence making gifts in her favour. By the time they have contributed a total sum of, say, Rs. 25,000, the N.C.E. may consider it worth while to exhibit appreciation of such solid services by conferring on the donors the degree of Bachelor of (M., E. or Ch.) Engineering *honoris causa*.

These are some of the suggestions to which the attention of the N.C.E. as well as of the Alumni Association is being drawn for careful consideration in the interest of Greater Jadavpur. The contacts and *liaisons* of the Jadavpur Campus with the industrial world as well as the cultured public may thereby acquire a definite expansion to the mutual benefit of the College and the people.

SECTION 5

Sturdy Jadavpurians during Demobilization and Depression (1946-50)

The Alumni Association may eventually grow into the sinewy hands and feet as well as the penetrating eyes and ears

of the N.C.E. Indeed, I am already visualizing a period,—not far-off—say, by 1950 when the complete “alumnification” of the N.C.E. will have been a *fait accompli*. The financially successful Jadavpurians have been working for their *Alma Mater* as sincere patriots since 1937-42. There is every reason why the total command of the N.C.E. should pass into their hands in the near future. That consummation will be the final solution of the many problems that were tending to arise on account of the Alumni Association’s real position as that of *imperium in imperio* in relation to the N.C.E.

Already, it is in the Alumni Association that what may be called the “spirit of Jadavpur” is to be seen embodied. The Jadavpur spirit is the spirit of 1905,—the ideas and ideologies of exact and positive science harnessed to the utilization of natural resources. It is the techno-scientific research spirit, the mentality which manipulates and organizes Nature and the social environment to the service of man. In the second place, the Jadavpur spirit is the spirit of devotion to the country’s cause and self-sacrifice in the interests of the motherland. It is the same nationalism that inspired the fathers of the Bengali revolution of 1905 in which the N.C.E. was born.

Luckily, the spirit of Jadavpur has not remained mere spirit. The mentality, the ideology, and the tendency have bred explorations, adventures and exploits and become the foundation of new consummations and new creativities, new practices and new customs. These creativities are continuous and steady. They have, therefore, succeeded in establishing what should be called a “tradition,”—the Jadavpur tradition. The Alumni Association as the embodiment of the Jadavpur tradition has been constantly developing these activities, consummations, enterprises and practices.

The adventures and enterprises of Jadavpurians com-

prise industrial establishments, factories, workshops, machinistic warehouses, electrical works, mills, chemical concerns, and export-import offices. Industry after industry, firm after firm, tools and implements after tools and implements,—although very often of modest dimensions—these have constituted the order of the day in the career of Jadavpurian engineers and technologists as explorers, pioneers, adventurers and scouts in the field of industry and commerce.

The equation, Jadavpurian = Industrialist and Business Organizer, is one of the most substantial factors in the social economy of India today. The Jadavpur tradition has enormously enriched our masses and classes with new personalities and new types of character.

The Silver Jubilee of the Alumni Association that is going to be celebrated in 1946 will in reality be a Jubilee of Indian industrialism to a considerable extent. The industrial and commercial careers of several hundred Jadavpurians,—engineers and technologists,—are appropriate themes for congratulation among the Indian people. This Jubilee will have great significance for Young Bengal as well as for Young India. (P. 134).

It was in the World-War II atmosphere of encyclopaedic inflation,—inflation of employment, inflation of output, inflation of wages and salaries, and inflation of prices and currencies,—that during 1942-45 the Alumni Association functioned as friends and benefactors of the N.C.E. That expansion, inflation and boom is getting to be a thing of the past. It is being replaced by a period of disemployment, unemployment and under-employment, of industrial and commercial bankruptcies, of depression in all sectors, and all-round deflation. The demobilization-economy is tending to force the Alumni Association to face a crisis in the field of patriotic services for the *Alma Mater*. The Association is likely to be on trial during the next

quinquennium. It is, however, to be trusted that younger members of the sturdy Jadavpurians will know how to function as the surest hands and feet and the keenest eyes and ears of the N.C.E. and boldly accept the challenge of an eventual world-wide economic depression.

It is perhaps the Jadavpurians of the classes 1925-34, or may be 1910-34,—that have been prominent as adventurers, explorers and pathfinders in the field of patriotic service for their *Alma Mater*. They have set the ball rolling. Their elbows have need to be strengthened by support from younger flesh and blood. A spiritual and financial blood-bank, so to say, has been initiated by the energism, adventurousness and organizing ability of the men between the ages of 35 and 45 or even 55. It is now time for the classes 1935-45, i.e., the Jadavpurians, of say, between 25 and 35 to contribute their devotion, enthusiasm and self-sacrifice to the strengthening and expansion of their *Alma Mater*, to the building up of Greater Jadavpur.

Like the N.C.E. the Alumni Association also has need to be rejuvenated,—i.e., enriched with fresh and young blood,—every moment of its existence. The juniors of the most recent quinquennium ought to be treated and get the chance of co-operating as effective colleagues with the seniors, i.e., members of the classes 1910-20, 1925-35 and so on. The Executive Committees of the Alumni Association bear this permanent responsibility of having themselves automatically reorganized and reconditioned in the interest of adequate representation, efficiency and uptodatization.

It is superfluous to add that virtually every institution in every country of the world runs the risk of developing autocratic tendencies. Both in India and abroad the administrative organs of public bodies can therefore be never too cautious in the matter of guarding against the emergence of

undesirable features, e.g., vested interests, despotocracy, and chauvinistic megalomanias.

India expects that the Younger Jadavpurians of 1934-45 will be worthy successors and colleagues of their elder brothers of 1910-34. The fortunes of the National Council during the ensuing period of demobilization, deflation and depression will depend in a very large measure on the go-aheadness, patriotism and business ability of the young Jadavpurians of 25-35. The senior alumni should know how to educate the alumni of the youngest groups,—say, of the last five years (1941-45) up to the responsibilities and obligations of themselves. The new vistas and “another life beyond” that are appearing on the horizon are waiting to be explored and utilized by these junior and juniormost alumni in the interest of their Greater Jadavpur.

Unluckily, at the present moment Jadavpurians have special reasons for trying to husband out their spiritual resources and *morale*. For, they have been cruelly struck by a bolt from the blue in the premature and sudden death of one of their ablest and greatest leaders.

The death of Kiron Roy (b. 1903) on October 19, 1945 has removed from Jadavpur College one of its towers of strength. He had four madnesses: first, madness for industrialism, technocracy and capitalistic developments, secondly, madness for his first *Alma Mater*, Jadavpur College, Young Jadavpur, and Jadavpurians (Alumni Association), thirdly, madness for Bengal, Bengali businessmen and Bengali industry and commerce, and last but not least, madness for the Massachusetts Institute of Technology, his second *Alma Mater*, M.I.T. Indians and Americans, and Americanism in industrial methods and cultural expansion. For the N.C.E. Roy was a genuine and sincere “key-man”, a tremendous dynamo of action, a veritable *enfant terrible*. His energism endowed him with qualities such as in East Bengal,—especially

in Dacca, the district of his birth,—are generally described as the marks of an *Asur* (Titan). This titanic enthusiasm and will he consecrated to the N.C.E. for the progress and prosperity of Jadavpur College.

It is obvious, however, that Roy was not a single swallow that does not make a summer. The madnesses of Roy happen to be the madnesses of quite a number of Jadavpurians. And they have come together as the nucleus of the Kiron Roy Memorial Committee (estd. Nov. 2, 1945) in order to carry out some of the programmes with which he was identified in the interest of a better and greater Jadavpur.

Young Bengal (1946-50), they were not giants and supermen,—the scholars, organizers, educationists, donors and patriots of 1905-10. Nor are you mollycoddles and pygmies. They were not *avatars* of self-sacrifice and spirituality, nor are you philistines and embodiments of materialism. These men just did their duty, and that is all. The limits of their achievements were exceeded by the men of 1920-25. These latter by their creativities succeeded in eclipsing their predecessors. In their turn these latter are being outdistanced, inch by inch, by the enthusiasts, explorers and pathfinders that have succeeded them. This is in one word the story of Jadavpur College, nay, of the entire Bengali people from 1925 to 1945.

Do, therefore, the duty that lies nearest you, and go on conquering and to conquer. It is for you to carry the N.C.E. and Jadavpur onward and upward to limits much beyond the attainments of 1940-45. You are no less powerful and significant and worth while than were the fathers of the glorious Bengali revolution. You are to be the architects of Greater Jadavpur and of Greater Bengal, indeed, of Greater India.

CHAPTER VII

Epilogue

Total “Alumnification” of the N.C.E.

In the present study businessmen and educationists will find an objective account of Jadavpur College as an instrument of industrialization, “*mistrification*,” and economic modernization. The achievements of the College have been exhibited through the activities of the Collegians. The atmosphere called up is principally that of techno-industrial developments, inventions and discoveries, scientific research, and economic transformations,—both at home and abroad. Attention is being focussed on the work of Jadavpurians as engineers and chemists. The tremendous remakings of the industrial “great powers” have been perpetually placed in the perspective of economic changes in India, halting and modest as they are. One is impressed by the exceedingly limited and petty resources at the disposal of the College in every quinquennium and the substantial work accomplished in spite of financial and other handicaps.

The idealism of Satish Mukerjee of the Dawn Society, one of the makers of Young Bengal, donors like Brajen Roy-Chowdhury, Zamindar of Gauripur (Mymensingh), Maharaja Surya Acharya of Mymensingh, “Raja” Subodh Mallik, Barrister Tarak Palit, Maharaja Manindra Nandi of Cossimbazar, and Advocate Rashbehari Ghosh, and educational organizers like Judges Gooroodas Banerjee and Ashu Chowdhury, Professor Aurobindo Ghosh, as well as Attorney Hiren Datta, Geologist Pramatha Bose, Barrister Abdul Rasul, and Medical Practitioner Nilratan Sarkar has been thoroughly justified. The engineers and chemists turned out by the National Council of Education have by their industrial and commercial enterprises succeeded in repaying to the country

many times the amount of money,—the few hundred thousand Rupees,—donated to its institutions by the financial benefactors and patriots of 1905-21.

It is, however, not with the object of inviting attention to the past self-sacrifices and patriotic endeavours that this survey has been undertaken. The chief aim is to explore the possibilities of Jadavpur College as an agency for the next flights in industrial-technocratic development, economic modernization, and techno-scientific research. The need for financial support from businessmen and philanthropists, both Indian and non-Indian, as well as the Governments of India and Bengal would force itself upon everybody's notice in the interest of a more efficient future of the Indian people as a link in a better world-order.

Nearly three thousand engineers and technologists of different grades have been the contributions of the N.C.E. to India during the last forty years. Quite a number of these Jadavpurians is today well-established in profession and public life. Their impacts on society and culture are immense. Some of them possess a distinction which is on a par with that of successful Barristers, advocates, medical practitioners and retired high-salaried Government officials. Both in income and rank many Jadavpurians of today belong to the *élites*. They constitute, indeed, the first specimens of a new aristocracy. This is the aristocracy of industrialism, modern materialism, and techno-economic capitalism. In competition with the feudalistic, landed or zamindari bourgeoisie the Jadavpurian bourgeoisie of technocracy and industrial power is a rising and militant force in the social world of India.

This situation has to be appraised at its proper worth and faced in a socio-diplomatic manner. There was a time when the management of the N.C.E. had to be entrusted to lawyers, zamindars, medical practitioners and retired Gov-

ernment officials simply because these categories were ranked high in social estimation. That necessity has nearly ceased to exist. Their sons and grandsons, the alumni of the N.C.E. are today rated high enough in public eye to be able to dispense with non-engineering, non-technocratic and non-scientific outsiders as their bosses, chaperons and guardians for the external world. (Pp. 28-30).

A further consideration is the quality, quantity and variety of self-sacrifice and devotion to the cause of the N.C.E., Jadavpur College, and the national education movement in general for which the Jadavpurians of the last decade have deservedly won the appreciations of the country. It is questionable if the governors of the National Council during the last so many years (with the exception of the prisoners of 1905-10) could ever vie with these alumni in patriotism, self-sacrifice and identification with the N.C.E.'s interests.

Be it noted also incidentally that the academic, factory and industrial qualifications of a large part of the Jadavpur teaching corps—many of whom are Jadavpurians—are among the highest by any standard. Eur-American Colleges of Engineering and Technology are not in general manned by teachers of superior merit. Indian public ought to be thoroughly conscious of this fact. (Pp. 297-299).

The management of the N.C.E. may now be transferred wholesale to the brains and brawns of its alumni. There is no justification for keeping the Jadavpurians down as second-grade or third-grade men to be pupilled and guardianed by outsiders of distinction. No outsiders of social position are at the present moment higher in calibre, character and contributions to the N.C.E. than the Jadavpurians themselves. The government of the N.C.E.'s affairs by the alumni—"alumnification"—is one of the disiderata for Greater Jadavpur. And this alumnification ought to be total or hundred per cent.

I have observed in another context that the co-operation of a practising lawyer should always be a necessity in educational administration. Equally indispensable for an educational institution is the managerial co-operation of a practising medical man. But otherwise the N.C.E. can be safely alumnified from top to bottom. For this total alumnification of the N.C.E. the country should not wait longer than up to 1950: (P. 30).

In interhuman relations and social patterns as embodied in a public institution the most fundamental fact is power. The distribution of power and the enjoyment of power are the eternal verities of public life. It is power politics that is the ruling factor even in the tiniest platoons of organized existence. And power is such a thing as tends to get concentrated and monopolized. This concentration and monopolization of power cannot be counteracted except by rivalry, jealousy and envy giving rise to conflicts, disharmonies, disequilibria. Competition between power as *status quo* and power that is militant belongs to the daily routine of group-formations, community-plannings and institutional configurations. The N.C.E. as a socio-cultural *Gestalt* has always been and is bound to remain the permanent theatre of such competition and disequilibrium.

In the administration of an educational institution as in every other administration the conflict or controversy between the old and the young is inevitable. The old comprises the old as well as the older. Similarly the young comprises the young and the younger. The Alumni Association may generally be treated as young *vis-à-vis* the N.C.E. But within the Alumni Association itself there are the seniors and the juniors *i.e.*, the old and the young.

Hence the "alumnification" of the N.C.E. does not by itself solve the problems of rivalry involved in ideological differences engendered by diversity of age. The junior

alumni (age group 25-35) is not likely to see eye to eye with the senior group (45-55).

Then there is the problem of the moneyed *vs.* unmoneyed individuals or rather the tug of war between the relatively more moneyed and the relatively less moneyed. The Alumni Association as a group hates the domination by moneyed members of the N.C.E. But there are more moneyed and less moneyed individuals among the alumni themselves. And the younger alumni are not very often as moneyed as the seniors. The tug of war between the less moneyed and more moneyed alumni is a matter of course. The conflicts over the administration of Jadavpur College are therefore expected to remain constant even during the regime of alumnification.

The key to progress in an educational as in other institutions is to be found in this disharmony. The N.C.E. and the Jadavpurians must have to practise perpetual preparedness for this "creative disequilibrium."*

Jadavpur College is at present expecting substantial grants,—both recurring and capital,—from the Government. This is a consummation richly deserved by it on account of the solid contributions to Indian industry and culture made during the last forty years. There is no doubt that creative disequilibrium, which has furnished the foundation of its progress up till now, will constantly be a work in the coming years also to help forward the unfolding of fresh constructive activities on the part of Jadavpurians.

* For the doctrine of creative disequilibrium see B. K. Sarkar: *Villages and Towns as Social Patterns* (Calcutta, 1941), pp. 491-663.

POST-SCRIPT TO PART II

The Calendar of Jadavpur College in Evolution

(1905—January 1946)

*December 1945—January 1946**

1945, December 23. At the Annual Social of the Alumni Association Editor Murton Peer of the *Yank Magazine* (published for the U.S. Army in India) is requested to describe in an informal manner some of the educational facilities available for foreigners in the U.S.A. Dr. Amulya Ukil of the Foreign Education Committee of the Alumni Association, Dr. George Noronha of the Indian Telegraph Association, Professor Hiralal Roy, and one of the seniormost alumni, Jatin Set, A.B. (Harvard) also speak. Among others Miss Helen Sexton, Vice-Consul of the U.S.A., and Mrs. Frances Noronha A.B. (Radcliffe, Mass.) are present. Some three hundred alumni with their families listen to the talks.

The present author draws attention to the increasing interest of American millionaires in export-import trade with India as well as of American Universities in the educational and industrial developments of the Indian people in modern times. The establishment or enlargement of Indic Departments for the study of the modern economic and cultural conditions of India is a noteworthy feature of educational institutions in the U.S.A. at the present moment.

He expresses his conviction that in the U.S.A. today, among business men doing export-import trade with India, it should be easy to find some fifty persons each capable of "adopting" or financing a junior professor of Jadavpur for higher engineering instruction (doctorate) and factorification in their country at a cost of some \$ 3000 (say, Rs. 10,000) per head. This is a paltry sum for American industrial magnates.

1945, December 29-30. Chemical Engineer Atul Datta (Jadavpur Soap Works) of the Alumni Association finances the excursion of Professor Hiralal Roy to South India and Bombay. *En route* to the Indian Science Congress Session

* This portion is to be read at the end of p. 66.

at Bangalore Dr. Roy visits the Andhra Paper Mills at Rajamundry as guest of Mr. G. K. Acharya, a representative of the Managing Agents, who happen to be one of the benefactors of the N.C.E., and arranges for the factorification every year of three Jadavpur students of chemical engineering.

1945, December 30. The College is visited by and is at home to the Delegates attending the Silver Jubilee celebrations of the Institution of Engineers (India). The party comprises, among other engineers, Nawab Zain Yar Jung Bahadur (Hyderabad, Deccan), the President of the celebrations, N.V. Modak (City Engineer, Bombay), Dildar Hussain (Chief Engineer, Irrigation, Hyderabad, Deccan), D.K. Khanna (Chief Engineer, Lahore), E.A. Nadir Shah (Waterworks Engineer, Bombay), P.R. Agarwal (Dy. Director, Mechanical Engineering, Railway Board, New-Delhi), Principal Dr. K. C. Chakko (Engineering College, Annamalai), Principal J. A. Taraporewalla (College of Engineering, Poona), P. P. Adalja (Chairman, Bombay Centre of Institution of Engineers), Man Singh (Special Officer, Damodar Valley Scheme), K. R. Sharma (Irrigation Engineer, Lahore), Prof. A. Viswanath (Engineering College, Madras), J. C. Hardikar (Bombay), Suren Chakravarti (Chief Engineer, P.W.D., Lucknow), Pratap Bose (Chief Engineer, Public Health, Bengal), Panna Lall Gupta (Chief Engineer, E. I. Ry., Calcutta), and Hari Bhaumik (Chief Engineer Retd., Posts and Telegraphs, Government of India).

1946, January 1-13. At Madras Professor Hiralal Roy contacts the businessman, G. R. Acharya, and at Bangalore the engineers, P. H. Kutar, W. Gandhi, Dr. Himanshu Mitra, and Mr. Engineer of Tisco (Jamshedpur), Y. N. Kotwal (of Bombay Municipality), Dr. D. P. Antia of Canadian Aluminium Company, Dr. Sarkar of the Barari Coal Company, Dr. M. Qureshi (of Hyderabad), Dr. Mehta (of Delhi Polytechnic), P. N. Joshi (of the Victoria Jubilee Technical

Institute, Bombay), as well as Chemical Engineer Nandi and Dr. Sir Jnan Ghosh (of the Indian Institute of Science). He takes part in the Science Congress symposia on the utilization of low-grade minerals as well as on the standardization of weights, measures and coinage.

At Bombay he visits the Chemical Technology Department of the University, and contacts Drs. G. P. Kane and K. Venkataraman, Mr. Sathe and other members of the staff. Invited by Director Venkataraman he delivers a lecture before the students and the staff on the prospects of industrialization in India (12 January).

1946, January 8. The College is visited by Monsieur Christian Fouchet, Consul General for France, Prof. Olivier Lacombe, Cultural Attaché to the French Consulate-General, Prof. Paul Lévy, anthropologist, and Mme Lévy of Indo-China, and Mlle Suzanne Karpeles, indologist of Paris. They are treated to lunch by Professor-Emeritus Suren Roy, M.E.E. (Harvard), Offg. Secretary, N.C.E.

At the lunch which is attended by about a dozen Professors of the College including Principal Dr. Triguna Sen and some Jadavpurian industrialists, M. Fouchet says in part as follows: "We in France are aware of the valuable contributions of India to literature and philosophy. Jadavpur College is a new discovery for us. We have seen with our own eyes that Indians are distinguished also in modern scientific and industrial achievements. The management of the laboratories and workshops, the syllabuses of studies as well as the high qualifications of the teaching staff indicate that your College is on a par with the great Engineering and Technological Colleges of the Western World."

Professor Lévy observes that "the scientists and engineers of France will certainly be happy to come into cultural collaboration and exchange with the Professors of Jadavpur College."

Mlle Karpeles says: "My mother and my sister as well as myself have been friends of Indians visiting Paris for a long time. We are proud to have had men like Jagadis Bose, Rabindranath Tagore and others among our guests. In the Jadavpur atmosphere I find that Bengal gives us not only intellectual and spiritual light but also electric lamps and material light. I am en route to Indo-China and I trust it will be possible for me to obtain friends for India among the scholars of that country. India furnished in a great measure the origin of the culture of Indo-China. There should be intimacy between these two countries in modern times."

While giving in French an account of Jadavpur College at the suggestion of Secretary Roy the present author observes as follows: "Of the seventy-six members of the teaching staff some eighteen possess engineering degrees from Harvard, M.I.T. (Boston), Illinois, Worcester, Michigan, Purdue, Berlin, Munich, Glasgow, Edinburgh, Sheffield, and London. Only one possesses the French degree (Dr. es Sciences of Paris). Perhaps it may be convenient for the French Academies and educational authorities to institute *bourses* (stipends) for three younger professors of Jadavpur enabling them to acquire higher instruction in engineering at the *Conservatoire des Arts et Métiers* of Paris and the Technological Institutes of Nancy or St. Etienne. The three departments of Mechanical, Electrical and Chemical Engineering can then be equipped each with a representative of French science and technology."

1946, January 14-17. The College is visited by Francis Watson, B.A. (Cantab.), O.B.E., Director, Research and Reference Division of the Department of Information, Government of India, Rai Bahadur Modi of Modinagar (near Meerut), industrialist, Businessman Bajoria (Calcutta), Ahmed Ali Kohzad, archaeologist, Director of the Museum of Kabul and editor of *Revue Ariana*, Marcel Destombes, social geographer

and cartographist (Paris), Dr. Sir Louis Fermor, F.R.S. (London), geologist, Industrialist Babulal Rajgarhia, (Calcutta), and A. J. Dash, I.C.S., Sahid Suhrawardy, B.A. (Oxon.) and Rai Bahadur Surendra Mohan Roy of the Public Service Commission (Calcutta).

1946, January 16. Sj. Biren Roy-Chowdhury, M.L.C. Zamindar of Gauripur (Mymensingh), Member of the Managing Committee of the General Department of the N.C.E., is at home to some of the delegates to the Jones Bicentenary celebrations of the Royal Asiatic Society of Bengal and several engineers of the U. S. Army and Navy as well as introduces them to the members of the Executive Committee of the N.C.E. The party, which is signalized by Roy-Chowdhury's exquisite playing on the *vina* (stringed instrument), comprises, among others, M.A. Kohzad (Afghanistan), S. M. Razavy (Iran), His Highness the Prince Kindavong of Laos (Indo-China), Dr. and Mrs. A. Bake (Holland), Lt.-Col. Rigal (French Central Africa), Mlle Karpeles (Paris), Lt. and Mme Pouchoy (Paris), Marcel Doré, economist (Laos), Capt. and Mme de Pindray d'Ambelle (Paris), Professor and Mme Paul Lévy (Hanoi, Indo-China), Capt. Hugonnier (Saigon, Indo-China), Prof. O. Lacombe of the French Consulate General (Calcutta) and Mme Lacombe, Bloch Lainé, financial adviser (Indo-China), Mme Schlap-pianoff (pianist), Edouard Axelrad, poet (Paris), as well as Lt.-Col. W. R. Ziegler, Major S. Kent, Capt. H. Dye, Capt. G. Speal, Lt. L. Hogan, Lt. S. Forkner, Capt. E. Leverone and Lt. Commander Durant of the U.S.A.

Razavy and Kohzad speak on the affinities of Indian music with that of Iran and Afghanistan. According to Prince Kindavong, Laos got her music from India but has not been able to modernize it as India has done. Dr. Bake refers to the heightening of the effects of the *vina* on account of the accompaniment of the *pakhwaj* (the double-drum).

Mlle Karpeles and Professor Lévy maintain that they can appreciate Indian music. To the American engineers Ziegler and Leverone Indian music appears interesting.

Requested by the host to say a few words, the present author observes that Roy-Chowdhury, besides being a skilled instrumentalist, is a patron of music and musical literature and conference. His father, Sj. Brajen Roy-Chowdhury, one of the donor-founders of the epoch-making National Council of Education, is a pioneer in modern banking, insurance, manufacture, farming and technological education. The Roy-Chowdhuris, like many other representatives of the zamindari (landed) bourgeoisie of Bengal, have contributed in a considerable measure to the establishment of culture-contacts between East and West and the reform movements in India.*

1946, January 17. Principal Dr. Triguna Sen and Secretary Suren Roy invite some members of the teaching staff to meet American engineers like Lt.-Col. W. R. Ziegler, Major F. C. Schleicher, Capt. H. Dye, Capt. L. S. Major, Capt. E. Leverone, Capt T. H. Galvin, and Father F. N. Loesch, S.J. (of St. Xavier's Technical School, Patna). Ziegler and Schleicher discuss the facilities in the U. S. Universities and Technological Institutes such as may be rendered available for the junior professors of Jadavpur College. Rev. Loesch emphasizes the necessity of manual labour for engineers. Professor-Emeritus Suren Roy recalls his first employment at Boston (Mass.) as a sweeper in a workshop.

At the request of Principal Sen the present author makes the following observations while saying *bon voyage* and *au revoir* to Col. Ziegler :

* About "Brajendra-mandal," i.e., the Brajen Roy-Chowdhury Circle of 1905-10 see *Benoy Sarkarer Baithake* (Interviews with B.S.), by Hari Mukerjee, Shib Datta and others, Vol. I. (Calcutta, 1944), pp. 119, 305-306, 309, 315, 317.

"The presence of the Texas Engineer, Major Schleicher, in this Hall reminds me of my first contacts with him and Cols. Gordon and Leedham of the American Base Hospital as well as Col. Jernigan and Major (later Lt.-Col.) Mayer, Engineers of the U. S. Army. This was sometime in July 1944 in the salon of Jatish Mukerjee, Chief Officer of Calcutta Corporation. On that occasion we started the idea of an Indo-American Association which subsequently took shape on account of the enthusiasm of several American-schooled and American-factoried Bengali businessmen such as Suren Bose of Bengal Waterproof Works, Khagen Das-Gupta of Calcutta Chemical Co., Jatish Das of Bengal Central Bank, Kshitish Biswas of Provati Textile Mills, and Jadavpurians like Biren Das-Gupta of Indo-Swiss Trading Co., Suren Datta of Plycrete Ltd., Suren Roy of Bengal Belting Works, Kiron Roy of Oriental Mercantile Co. and others. And nobody was more active than Kiron Roy in the matter of introducing Jadavpur College into the Indo-American complex. It was through Schleicher that I got to know of the "Blue Earth" Workshops at Kidderpore and the chances of work over there for Jadavpur engineers. My contacts and acquaintances I communicated to Professors Triguna Sen, Manmatha Chakravarti, Hiralal Roy, Baneswar Dass, Suren Roy, Hem Guha, and others. In July 1945 it was possible to place a few Jadavpurians for "factorification" at these Workshops through the friendly co-operation of Col. Ziegler and his associates, some of whom are present here this evening. To these American friends we are all grateful. I am sure Jadavpur engineers and professors have learnt great lessons from intercourse with American engineers like Ziegler, Eberlin, Mayer, Schleicher, and others. The souvenir of the attainments, experience and character of these American friends will be a valuable possession to them for life. And I trust that Col. Ziegler and his colleagues are carrying home with them

pleasant memories of their association with Jadavpur professors."

1946, January, 20. The "factorification" of the students of chemical engineering is arranged by Professor Banesvar Dass at Calcutta Chemical Co. and other chemical concerns.

Professors Satis Bhattacharya, Jatin Bose, and Sudhir Chakravarti of the Mechanical Engineering Department succeed in arranging for the factorification of their students at Maya Engineering Works, Jay Engineering Works, Braithwaite & Co., Burn Co., Jessop Co., Mohini Mills, Birla Jute Mills, Port Engineering Works, and so forth. These and other factorifications are to come into force for the first time during 1946-47.

1946, January 21. Captain T. H. Galvin, graduate of the Colorado School of Mines (U.S.A.), addresses the students and professors of Jadavpur College on "Some Chemical Engineering Processes."

1946, January 23. Young Jadavpur celebrates the fiftieth birth-day of "Netaji" (Leader) Subhas Bose.

In the mammoth street procession covering as it does seven miles from the southern end to the northern end of the city under the command of Major-General Shah Nawaz of Subhas Bose's Indian National Army, Jadavpur College Volunteer Corps takes conspicuous part along with Khaksars, Sikhs, volunteers of the Azad Muslim Students' and Young-men's Union, I. N. A. soldiers, several hundred I. N. A. women volunteers, and volunteers of the Indian National Ambulance Corps. (*Amrita Bazar Patrika*, 24 January 1946).

1946, January 26. "Blue Earth" Workshops of the U. S. Army at Kidderpore (Calcutta) purchased by Jadavpur College. Its equipment is thereby enriched with a large supply of the most up-to-date tools, implements and machineries of diverse denominations.

APPENDICES

APPENDIX A

*Students of the National Council of Education Bengal*I. *The Number of Students and the Number of Passes 1913-45*

Year	Total No. of students on roll	Number of Students Passed						
		Mecha- nical	Electri- cal	Chem- ical	Junior Tech	Survey	School final	Agri- culture
1913	—	—	2	—	5	1	12	—
1914	—	1	1	—	1	2	8	—
1915	—	2	3	—	8	—	3	—
1916	—	—	—	—	—	—	—	—
1917	—	—	—	—	—	—	—	—
1918	150	—	3	—	12	3	—	—
1919	247	1	2	—	9	8	—	—
1920	250	3	4	—	13	8	—	—
1921	652	5	4	—	11	3	2	—
1922	661	10	3	—	5	2	—	—
1923	650	15	15	—	13	4	1	—
1924	700	12	25	—	25	5	11	—
1925	635	14	44	9	23	7	12	—
1926	650	9	51	7	13	9	9	—
1927	585	19	37	8	15	5	8	—
1928	556	8	14	4	11	11	15	—
1929	500	6	18	8	13	8	9	—
1930	490	11	16	6	12	5	7	—
1931	668	15	17	5	18	7	7	—
1932	581	16	18	3	9	8	3	5
1933	622	7	15	5	9	16	6	—
1934	554	10	17	3	23	12	3	—
1935	511	27	21	9	15	5	4	—
1936	512	26	30	13	22	10	5	—
1937	512	12	27	10	20	14	1	6
1938	769	18	26	7	11	10	3	7
1939	779	22	16	8	9	12	4	1
1940	1021	15	23	5	19	21	3	7
1941	1245	18	38	11	24	12	4	3
1942	1251	22	34	9	27	14	2	2
1943	1268	27	44	11	30	17	1	1
1944	1158	43	33	9	19	14	1	1
1945	1250	82	24	14	18	3	6	1

II. *New Admissions 1935-44*

	Agriculture 1st year	Survey	Junior Tech. 1st yr.	Eng. Preparatory	Chemical Preparatory	Eng. 1st year	Eng. 2nd year	Chemical 1st year	Chemical 2nd year	Chemical 3rd year	Mechanical 4th year	Apprentice
1935	11	20	41	—	—	85	23	10	6	3	—	—
1936	10	20	29	—	—	82	34	11	5	3	—	—
1937	8	36	55	—	—	115	29	7	6	5	—	—
1938	9	28	55	—	—	206	52	13	7	5	—	—
1939	8	25	56	—	—	196	74	13	7	5	—	—
1940	3	26	63	—	—	207	90	19	16	15	—	—
1941	2	38	77	213	13	110	—	17	4	—	—	—
1942	3	36	77	176	17	164	—	15	3	—	—	—
1943	4	26	72	174	17	154	2	25	10	—	—	—
1944	8	26	55	124	2	98	—	19	11	—	1	1

III. *The Total Number of Higher Engineering Students
(1939-46)**

Class	1939-40	'40-'41	41-42	42-43	43-44	44-45	45-46
Eng'g I	200	208	345	323	323	281	283
Chem. I	17	19	39	42	45	46	36
Eng'g II	249	300	145	190	182	175	154
Chem. II	25	38	23	30	33	37	36
M.E. III)	65	90	36	65	95	80	103
M.E. III)			61	45	41	27	39
Chem. III	11	22	16	14	22	19	27
M.E. IV	25	27	22	28	51	93	66
E.E. IV	49	50	38	47	39	34	30
Chem. IV	12	13	12	13	11	21	21
M.E. V	16	18					
E.E. V	36	40					
Chem. V	12	10					
	—	—	—	—	—	—	—
	717	835	737	797	842	763	797

* Upto 1940-41 Session there were five-year courses. In 1941-42 four year courses were introduced for I.Sc. and B.Sc. students. For Matric students a preparatory class was introduced which is not shown in the above table.

APPENDIX B

*Office-Bearers of the National Council of Education*I. *Presidents of the N.C.E.*

1906-1921 : Dr. Sir Rashbehari Ghosh (Advocate)
 1921-1924 : Justice Sir Ashu Chowdhury
 1924-1944 : Dr. Sir Prafulla Roy (Professor of Chemistry)
 1945 : Dr. Bidhan Roy (Medical Practitioner)

II. *Secretaries of the N.C.E. (Hony.)*

1906-1908 : Ashu Chowdhury (Barrister)
 Hiren Datta (Attorney)
 1909 : Ashu Chowdhury (Barrister)
 Deva Sarvadhikari (Attorney)
 1910-1911 : Dr. Nilratan Sarkar (Medical Practitioner)
 Deva Sarvadhikari (Attorney)
 1912 : Dr. Nilratan Sarkar (Medical Practitioner)
 Hiren Datta (Attorney)
 1913-1916 : Hiren Datta (Attorney)
 Abdul Rasul (Barrister)
 1917-1919 : Hiren Datta (Attorney)
 Fazlul Huq (Advocate)
 1920 : Hiren Datta (Attorney)
 Pramatha Mukerjee (Professor of Philosophy)
 1921-1931 : Hiren Datta (Attorney)
 Brajen Roy-Chowdhury (Zamindar)
 1932-1942 : Brajen Roy-Chowdhury (Zamindar)
 Satya Bose (Advocate)
 1943- : Satya Bose (Advocate)
 1945- : Suren Roy (Electrical Engineer and Industrialist)
 Offg. Secretary.

III. *Trustees of the N.C.E. (Hony.)*

1906-1908 : Maharaja Surya Acharya (Zamindar)
 Brajen Roy-Chowdhury (Zamindar)
 Subodh Mallik (Zamindar)
 1909-1920 : Brajen Roy-Chowdhury
 Maharaj-Kumar Shashi Acharya
 Subodh Mallik

1921-1924 : Brajen Roy-Chowdhury
 Maharaja Shashi Achaya (Zamindar)
 Sir Ashu Chowdhury (ex-Judge and Barrister)

1924-1933 : Brajen Roy-Chowdhury
 Maharaja Shashi Acharya
 Justice Bepin Ghosh

1934-1943 : Brajen Roy-Chowdhury
 Maharaja Shashi Acharya
 Jogesh Chowdhury (Barrister)

1944 : Brajen Roy-Chowdhury

1945 : Snehansu Acharya (Barrister)
 Sarat Bose (Barrister)
 Jogesh Chowdhury (Barrister)

IV. Treasurers of the N.C.E. (Hony.)

1906-1910 : Yatin Roy-Chowdhury (Zamindar)

1910 : Kumar Manmatha Mitra (Zamindar)

1911-1921 : Brajen Roy-Chowdhury (Zamindar)

1922-1931 : Rai Priya Mukerjee Bahadur (Retd. Govt. Official)

1932-1940 : Jogesh Chowdhury (Barrister)

1941- : Brajen Roy-Chowdhury (Zamindar)

V. Rectors of the N.C.E. (Hony.)

1910-1921 : Pramatha Bose (Geologist)

1922-1924 : Dr. Sir Prafulla Roy (Professor of Chemistry)

1924-1926 : Mohini Chatterjee (Attorney)

1927-1928 : Bipin Pal (Publicist)

1929-1930 : Prof. Benoy Sarkar (Economist, on tour in Europe)

1930-1931 : Dr. Sir Nilratan Sarkar (Medical Practitioner)

1932-1934 : Basanta Bose (Advocate)

1934-1942 : Dr. Sir Nilratan Sarkar (Medical Practitioner)

1943- : Justice Charu Biswas

VI. Auditors of the N.C.E.

1906-1925 : Ishan Bose (Honorary)

1926- : Ray & Ray, Chartered Accountants

VII. Hem Basu-Mallik Professors of the N.C.E.

1906-1908 : Aurobindo Ghosh, B.A. (Cantab.)

1908-1916 : Radha Kumud Mukerjee, M.A., P.R.S., PH.D.

1917-1921 : Kali Das-Gupta, M.A.
 1921-1927 : Pramatha Mukerjee, M.A.
 1927-1929 : Prabhat Mukerjee, Proficiency (N.C.E.)
 1929-1933 : Bidhu Datta, M.A.
 1934-1942 : Kali Das-Gupta, M.A.
 1943- : Vacant

VIII. *Probodh Basu-Mallik Fellows of the N.C.E.*

1913-1925 : Prof. Benoy Sarkar, M.A., *Vidya-vaibhava* (Benares),
 on world-tour (1914-25) : Hon. Fellow.
 1925-1928 : Dhiren Datta, M.A.
 1928-1931 : Mahamahopadhyaya Phani Tarkavagish
 1931-1937 : Jogen Mitra, M.A.
 1937-1942 : Dr. Bata Ghosh, Proficiency (N.C.E.), DR.PHIL.
 (Munich), DR. ES LETTRES (Paris)
 1943- : Vacant .

APPENDIX C

The Committees of the N.C.E. 1945

I. *Managing Committee of the*

“General Department” 1945

Justice Charu Chandra Biswas, M.A., B.L., C.I.E.
 Nalini Ranjan Sarkar (Insurance-man).
 Satyananda Bose, M.A., B.L. (Advocate).
 Sudeb Chandra Datta, A.M.E.E. (Jadavpur), *Secretary*.
 Dr. Triguna Charan Sen, A.M.M.E. (Jadavpur), Dr. Ing.
 (Munich), A.M.I.E. (Ind.), Principal, Jadavpur College.
 Susanta Kumar Chatterjee, A.M.E.E., (Jadavpur).
 Netai Chand Mallik, A.M.M.E. (Jadavpur).
 Prof. Jitesh Chandra Guha, M.A., B.L. (English Literature).
 Dhirendra Nath Ganguli, B.L.
 Nalin Chandra Paul, B.L., Advocate.
 Harsha Nath Mukerjee, Contractor.
 Shibapada Sen, B.A., Hons. (London), Lecturer in Modern
 and Contemporary History (Jadavpur).
 Asim Krishna Datta, M.Sc., Solicitor.
 Ajendra Krishna Ghosh, B.L., Solicitor.
 Charu Chandra Chowdhury, Advocate.

Sasanka Sekhar Bagchi, A.M.E.E. (Jadavpur).
 Kiron Chandra Roy, A.A.I.E.E. A.M.E.E. (Jadavpur), B.S.,
 (Mass. Inst. of Tech.).
 Sudhangsu Chakravarti, A.M.E.E. (Jadavpur).
 Moni Bhushan Majumdar, Hosiery Machines
 Manufacturer.
 Birendra Kishore Roy-Chowdhury, B.A., M.L.C., Zamindar
 of Gauripur.
 Bimal Chandra Ghosh, B.Sc. Econ. (London).
 Ashutosh Ganguli, M.A., Iron Merchant.
 Prof. Purna Chandra Biswas, M.Sc. (Physics).
 Prof. Naresh Chandra Sen, M.Sc., B.L. (Physics).

II. *Managing Committee of the College of Engineering
 and Technology, Jadavpur, 1945*
 See pp. 27-28.

III. *Executive Committee of the N.C.E.*
 See p. 29.

APPENDIX D

*Principals and Superintendents of Bengal National College
 Bengal Technical Institute and Jadavpur College of
 Engineering and Technology*

I. *Principals (1906-45)*

1906, 15 August-July 1907. Aurobindo Ghosh B.A. (Cantab),
 Hem Basu-Mallik Professor of Indian History, Principal, Bengal
 National College.

1906-08. Pramatha Bose, B.Sc. (London), F.G.S. (London),
 Honorary Principal of Bengal Technical Institute (under the
 Society for the Promotion of Technical Education).

1907, July-1908, August. Professor Satish Mukerjee, M.A.,
 B.L., Honorary Principal, Bengal National College.

1908, August-1910. Professor Chandra Nyayalankar, Honorary
 Principal, Bengal National College

1909 July-1910, June. Sarat Datta, M.A. (Cal.), Dipl. Ing.
 (Berlin-Charlottenburg), Professor of Mechanical Engineering,
 Principal of Bengal Technical Institute (under the Society for the
 Promotion of Technical Education).

1910, July-1941 June. The post of the Principal is abolished.

1941, July-August. Janaki Mukerjee, B.A., O.B.E., Principal, Jadavpur College.

1941, August-1943 May. Suren Roy M.E.E. (Harvard), Professor of Electrical Engineering, Principal, Jadavpur College.

1943, June-1944, June. Dr. Satis Bhattacharyya, M.Sc. (Cal.) A.M.M.E. (Jadavpur), Dr. Ing. (Berlin), Professor of Mechanical Engineering, Principal, Jadavpur College.

1944, June. Dr. Triguna Sen, A.M.M.E. (Jadavpur), Dr. Ing. (Munich), Professor of Mechanical Engineering, Principal, Jadavpur College.

II. *Superintendents (1906-41)*

1906, June-1908 August. Prof. Satish Mukerjee, M.A., B.L. Hon. Superintendent, Bengal National College.

1908 August-1910 June. Jagadindu Roy, Professor of Physics, Supdt., Bengal National College.

1909 July-1910 June. Sushil Chakravarti M.A., Professor of Physics, Superintendent of Bengal Technical Institute (under the Society for the Promotion of Technical Education).

1910, June-1917, May. Rishibur Mukerjee, Bar-at-Law, Sushil Chakravarti, M.A., Professor of Physics, Mani Banerjee, Professor of Chemistry, Jagadindu Roy, Professor of Physics, Purna Ganguli, B.Sc. (Glasgow), Professor of Mechanical Engineering.

1917, June-1939, May. Hem Chandra Das-Gupta, B.M.E. (Michigan), Professor of Mechanical Engineering, Superintendent, Bengal Technical Institute (and Jadavpur College).

1939-May 15-1941, June. Dr. Hiralal Roy, A.B. (Harvard), Dr. Ing. (Berlin-Charlottenburg), Professor of Chemical Engineering, Superintendent, Jadavpur College.

1941, July. The post of the Superintendent is abolished.

APPENDIX E

The Teaching Staff, 1945

Principal :—

Dr. Triguna Charan Sen, A.M.M.E. (Jadavpur), Dr. Ing. (Munich), A.M.I.E. (Ind.).

Department of Mechanical Engineering

Professor-in-Charge :—

Dr. Satish Chandra Bhattacharyya, M.Sc. (Cal.) A.M.M.E., A.M.E.E. (Jad.), Dr. Ing. (Berlin), M.I.E. (Ind.), V.D.I. (Berlin).

Professors :—

1. Dr. Jatindra Nath Basu, A.M.M.E., A.M.E.E. (Jad.), Dr. Ing. (Berlin), M.I.E. (Ind.), V.D.I. (Berlin).
2. Sudhir Kumar Chakravarti, A.M.M.E. (Jad.), B.S. (Worcester), M.S. (Michigan).
3. Atul Chandra Roy, B.Sc., Hon. (Glasgow).
4. Satyendra Bimal Sen, B.Sc. Eng. (Sheffield).

Asst. Professor :—

Amiya Kumar Basu, B.Sc. (Cal.) A.M.M.E. (Jad.).

Lecturers :—

1. Sailaja Charan Sen-Gupta, A.M.M.E. (Jad.).
2. Ananga Mohan Chatterjee, A.M.M.E. (Jad.).
3. Hari Gopal Ganguli, A.M.M.E. (Jad.).
4. Anadi Ranjan Basu-Mallik, A.M.M.E. (Jad.).
5. Gopal Chandra Sen, A.M.M.E. (Jad.).
6. Aswini Kumar Pal, A.M.M.E. (Jad.).
7. Pravash Chandra De, A.M.M.E. (Jad.).

Foreman Instructor :—

Hara Mohan Bose, A.M.M.E. (Jad.).

Instructors :—

1. Amulya Prosad Ghosh, A.M.M.E. (Jad.).
2. Pulin Behari Bhattacharya.
3. Protap Chandra Roy, A.M.M.E. (Jad.).
4. Charu Chandra Bhattacharya, A.M.M.E. (Jad.).
5. Bibhuti Bhusan Majumdar, A.M.M.E. (Jad.).
6. Binode Lal Das, A.M.M.E. (Jad.).
7. Girindra Nath Das, A.M.M.E. (Jad.).
8. Haridas Banerjee, B.M.E. (Jad.).
9. Makhan Lal Das.

Department of Electrical Engineering

Professor-in-Charge :—

Hem Chandra Guha, A.M.M.E. (Jad.), B.Sc. (Edin.) C.I.E.E. (London).

Professor Emeritus :—

Surendra Kumar Roy, M.E.E. (Harvard), M.A.I.E.E. (Jad.).

Professors :—

1. Manmatha Nath Chakravarti, B.Sc. (Cal.), A.M.M.E. (Jad.) B.S. (Worcester), M.S. (Purdue).
2. Nandlal M. Shah, B.A. (Bombay), M.S. (M.I.T. Boston).

Lecturers :—

1. Jatindra Mohan Palit, A.M.M.E. (Jad.).
2. Debendra Kumar Chakravarti, A.M.M.E. (Jad.).
3. Dharendra Kumar Deb, A.M.M.E. (Jad.).
4. Mriganka Mohan Kar, B.Sc. (Cal.), A.M.M.E. (Jad.).

Instructors :—

1. Benoy Krishna Sarkar, A.M.E.E. (Jad.).
2. Danindra Nath Ray-Bardhan, A.M.E.E. (Jad.).
3. Prakash Chandra Mandal, B.Sc., A.M.E.E. (Jad.).
4. Satya Narayan Sanyal, B.Sc., A.M.E.E. (Jad.).
5. Probhatty Kumar Sadhukhan, A.M.E.E. (Jad.).
6. Asoke Kumar Ghosh, B.E.E. (Jad.).

Department of Chemical Engineering

Professor-in-Charge :—

Dr. Hira Lal Roy, A.B. (Harvard), Dr. Ing. (Berlin), M.I. Ch.E. (England).

Professor of Industrial Chemistry :—

Banesvar Dass, B.S. Ch.E. (Illinois).

Professor of Chemistry :—

Gopal Chandra Banerjee, M.Sc.

Asst. Professor of Chemistry :—

Provrat Kusum Ray, M.Sc.

Lecturer :—

Kunja Lal Sen-Gupta, Proficiency (N.C.E.).

Demonstrators :—

Sudhir Chandra Das-Gupta, B.Sc.

Instructors :—

1. Bimal Chandra Chanda, A.M.Ch.E. (Jad.).
2. Kamalendu Sen-Gupta, M.Sc.
3. Dilip Kumar Datta, M.Sc., A.M.Ch.E. (Jad.)
4. Nalini Ranjan Mukerjee B.Sc., A.M.Ch.E. (Jad.).

Lecturer in Soap Technology (Hony.) :—

Ratan Bihari Datta, Manager, 'Nasco'.

Lecturer in Food Technology (Hony.) :—

Bibhuti Bhushn Chakravarti, A.M.Ch.E. (Jad.), Manager, Gardeners.

*Physics***Professor :—**

Purna Chandra Biswas, M.Sc.

Asst. Professor :—

Naresh Chandra Sen, M.Sc., B.L.

Lecturers :—

1. Upendra Nath Banerjee, B.A., M.Sc.
2. Harendra Nath Mukerjee, Proficiency (N.C.E.).
3. Hari Pada Sen, M.Sc.

Demonstrators :—

1. Lakshmi Kanta Coondoo, M.Sc.
2. Subodh Chandra Chakravarti, M.Sc., B.T.

Instructor :—

Purnendu Kumar Banerjee, B.Sc.

*Mathematics***Professor :—**

Satish Chandra Chakravarti, M.Sc.

Asst. Professors :—

1. Amar Nath Pramanik, M.A.
2. Jagat Chandra Paul, Proficiency (N.C.E.).

Instructors :—

1. Sudhindra Nath Chaudhuri, M.Sc.
2. Naresh Chandra Samajpati, M.Sc.

Humanities

Modern and Contemporary History (Lecturer) :—

Shiva Pada Sen, B.A. Hons. (London).

Engineering Economics (Lecturer) :—

Abani Mohan Roy, M.A., B.COM. (Edin.) F.S.A.A.C.A., R.A. Labour Economics, Industrial Psychology & Social Work (Hony. Professor) :—

Prof. Benoy Kumar Sarkar, M.A., *Vidyavaibhava* (Benares), Dr. h.c. (Tehran).

Man the Known, and Man the Unknown (Hony. Lecturer) :—

Sachin Bandopadhyay, B.Sc. (Glasgow).

English Language and Literature (Lecturers) :—

1. Shiva Pada Sen, B.A. Hons. (London). 2. Khagen Das-Gupta, M.A.

Geology (Lecturer) :—

Dr. Shiva Sundar Deb, Dr.-es. sc. (Paris).

Religion (Lecturer) :—

Pandit Heramba Nath Bhattacharya, Vyakarana-Sankhya-Vedantatirtha.

French and German :—

The Department of Modern Languages and Cultures with special reference to French and German is being organized for the session 1946-47.

Department of Survey & Draftsmanship

Teachers of Survey and Drawing :—

1. Girindra Narayan Das. 2. Pramatha Nath Roy.

Department of Agriculture

Farm Superintendent and Lecturer of Agriculture :—

1. Benoyendra Nath Mandal, B.Sc. (Wales), War Service, on leave. 2. Harendra Kumar Mazumdar, M.Sc. (Offg.).

Instructor :—

Subodh Chandra Das-Gupta.

Physical Culture

Instructors :—

1. Baneswar Sarkar. 2. Jahar Paul.

APPENDIX F

Finances

I. Receipts and Expenditures of the N. C. E. 1925-44

Year	Total Receipts	Total Exp.	For Construction	Equipments	Library
1925	2,45,270 6 0	3,67,741 11 3	93,103 2 3	23,904 8 4	1,028 11 4
1926	3,10,177 10 7	3,51,052 4 2	91,887 0 0	97,522 7 3	1,073 0 6
1927	1,86,857 9 1	4,52,786 7 10	37,990 5 6	23,931 3 9	4,446 5 11
1928	3,26,979 12 3	4,04,352 10 7	29,547 15 9	56,645 5 7	—
1929	2,14,801 11 11	2,38,367 13 11	16,706 14 3	6,426 13 3	1,211 15 8
1930	1,90,076 9 8	1,88,287 12 10	—	532 12 0	1,301 0 9
1931	1,96,565 9 4	2,08,207 9 11	1,200 0 0	603 5 0	926 5 9
1932	1,91,205 11 7	1,71,972 1 2	—	310 0 0	687 0 0
1933	2,05,247 8 4	2,93,302 1 2	—	475 15 9	879 1 6
1934	1,65,382 4 7	1,62,752 2 11	1,444 10 3	6,170 12 0	1,155 11 9
1935	1,99,370 9 4	2,06,979 1 4	—	2,704 7 0	—
1936	2,24,030 12 1	2,30,638 9 8	—	459 15 0	—
1937	1,77,840 4 1	2,09,287 11 1	—	1,028 11 6	—
1938	2,09,262 15 3	2,12,634 12 11	—	2,556 11 0	—
1939	2,10,256 9 8	2,11,306 1 4	—	1,942 2 3	—
1940	2,65,664 11 0	2,29,617 3 7	3,915 10 3	1,228 1 8	1,390 15 0
1941	2,96,509 5 8	2,74,277 4 6	31,001 0 0	2,315 14 3	1,649 14 6
1942	2,79,549 9 7	3,04,380 5 0	2,109 6 6	17,812 13 0	1,801 6 6
1943	4,99,176 3 1	4,81,070 14 6	6,714 6 3	32,826 8 0	2,433 13 3
1944	6,20,706 5 4	6,39,664 13 0	15,988 0 6	45,587 0 6	5,898 11 3

The above figures are taken from the Balance Sheets published in the Annual Reports of the National Council of Education.

II. *Donors & Donations (1906-46)*

I. 1906-09

<i>Names</i>	<i>Rupees</i>	<i>Date</i>
Brajendra Kishore Roy-Chowdhury, Zamindar of Gauripore (Mymensingh) (Endowment)	500,000	1906
Maharaja Surya Kanta Acharya, Zamindar of Mymensingh (Endowment)	250,000	..
"Raja" Subodh Chandra Mallik, Zamindar of Calcutta (Endowment)	100,000	..
Kailash Roy-Chowdhury, Calcutta	500	..
Sir Taraknath Palit, Barrister	106,000	1906-12
Maharaja Sir Manindra Chandra Nandi Bahadur, Zamindar of Cossimbazar	40,250	..
H.H. The Maharaja Nripendra Narayan Bhup Bahadur of Cooch Behar	23,950	..
H.H. The Maharaja Shree Ram Chandra Bhanj-Deo of Mayurbhanj	6,200	1906-11
H.H. The Maharaja Radha Kishore Manikya Bahadur of Tripura	4,600	..
H.H. The Maharaja Sir Bir Bikram Kishore Manikya Bahadur of Tripura	1,000	..
Raja Promoda Nath Roy, Zamindar of Dighapatia, Rajshahi	4,500	..
Byomkesh Chakravarti, Barrister	14,250	..
Sir Ashutosh Chowdhury, Barrister & Judge	17,716	..
Dhannulal Agarwala, Merchant	1,025	1906-10
Sir Rajendra Nath Mukerjee, Industrialist	4,000	..
Pannalal Dey, Attorney	240	1906-08
Brajendra Kishore Roy-Chowdhury, Zamindar of Gauripur, Mymensingh	5,820	1906-09
Yatindra Nath Roy-Chowdhury, Zamindar of Taki	9,700	1906-16
Hirendra Nath Datta, Attorney	31,250	..
Lokendra Nath Palit, I.C.S., Judge	10,000	1906-10
Sir Gooroodas Banerjee, Ex-Judge	8,540	1906-18

<i>Names</i>	<i>Rupees</i>	<i>Date</i>
Santan Sampradaya (Political Association) of Bhowanipore	1,200	1906-07
Kumar Sailendra Nath Mitra, Zamindar, Calcutta	3,000	1906-10
Dr. Sir Rash Behari Ghosh, Advocate	26,740	1906-20
Abdul Rasul, Barrister	600	1906-10
Mohini Mohan Chatterjee, Attorney	500	1907
Swadesh Hitaishini Sabha (Political Association)	275	1907
Kedar Nath Banerjee	500	1907
Kaviraj Bejoy Ratna Sen	250	1907-08
Maharaja of Tikary, Bihar	2,500	1907
Sarat Kumar Lahiri, Book-seller, Calcutta	288	..
Tilak Dhari Lal	1,000	..
Deep Narayan Singh, Zamindar of Bhagalpur	1,000	..
Dwarkanath Chakravarti, Advocate	1,000	..
Gopal Das Chowdhury, Zamindar of Sherpur, Mymensingh	1,000	1907-08
Lalit Mohan Ghosh, Advocate, Calcutta	480	1907
Kumar Manmatha Nath Mitra, Zamindar of Calcutta	3,000	1907-09
Through Prof. Satish Chandra Mukerjee, Dawn Society	2,000	1907-08
Satish Chandra Basu-Mallik, Zamindar of Calcutta	12,000	1908
Maharaj-Kumar Kristo Das Law, Raja Reshee Case Law, Chandi Charan Law & Ambika Charan Law, Zamindars of Calcutta	3,500	..
Jogendra Kishore Roy-Chowdhury	1,000	1908
Nalini Nath Bishi, Zamindar of Rajshahi	3,000	..
Kumar Sarat Kumar Roy, Zamindar of Dighapatia, Rajshahi	1,000	..
Satyendra Nath Tagore, I.C.S. (Retd.)	1,000	..
Mohanta Maharaj of Bodh Gaya	500	..
Sir Krishna Govinda Gupta, I.C.S. (Retd.)	500	..
Haricharan Bose, Pathuriaghata, Calcutta	250	..

<i>Names</i>	<i>Rupees</i>	<i>Date</i>
Haricharan Guha	500	..
Haricharan Ghosh	500	..
Kumar Arun Chandra Sinha, Zamindar of Paikpara	2,500	..
Rai Baikuntha Nath Sen Bahadur, Advocate, Berhampore	1,158	1908-20
Gaganendra Nath Tagore, Zamindar & Artist	2,000	1908-09
Prof. Benoy Kumar Sarkar	1,536	1909-13
Nirod Chandra Mallik, Zamindar of Calcutta	500	1909
Bholanath Dhar	1,000	..
Maharaja Jagadindra Nath Roy, Zamindar of Natore, Rajshahi	1,000	..

II. 1910-19

Through Prof. Benoy Sarkar and Prof. Radha Kumud Mukerjee	30,000	1910
Jogen Sett, Upper Chitpur Road, Calcutta	100	..
Heirs of Kaliprasanna Ghosh, Jorabagan St., Calcutta	200	..
Sris Chandra Bir Pratap Memorial Fund	220	..
Pramatha Nath Bose, Geologist	500	1911
Baldeodas Jugalkishore, Merchant	1,200	..
Prof. Radha Kumud Mukerjee	8,150	1911-15

III. 1920-1929

Durgadas Bose	25,000	1920
Dr. Sir Rash Behari Ghosh, Advocate	1,600,000	1921
Dr. Suresh Chandra Roy, Insurance Man	500	..
Kumar Krishna Datta, Merchant	600	..
Jagannath Prasad, Merchant	25,000	1921-31
Gopi Kristo Bose, 70/2, Maniktolla St., Calcutta	3,200	1923-24
Gopal Chandra Sinha, Zamindar of Calcutta (Endowment)	100,000	1925
Manilal Chatterjee	3,100	..
Corporation of Calcutta (Annual)	30,000	1927

<i>Names</i>	<i>Rupees</i>	<i>Date</i>
--------------	---------------	-------------

IV. 1930-39

Shiblal Shaw, Merchant	5,000	1932
Corporation of Calcutta	57,000	1933
Sashi Bhusan Dey	840	1933-39
Lalit Mohan Roy, Advocate, Dacca	500	1937
Dr. Sir Prafulla Chandra Roy	1,000	„
Jadavpur Estate Ltd.	600	1937-38
Atul Bose, Artist	500	1938
Prof. Surendra Kumar Roy	2,900	1938-41
Suren Acharyya (Mysore)	1,000	1938
Class of 1925	500	1939
Prof. Dr. Hiralal Roy	2,764	1939-40
Prafulla Kanta Banerjee, Industrialist, Narayanganj & Dacca	6,600	1939-44

V. 1940-46

Mrs. Jayasri Ghosh, widow of Engineer Suren Ghosh	20,000	1940
Atul Lahiri, Electrical Contractor	500	„
Satish Chandra De, Merchant	500	„
Class of 1926	500	„
Class of 1935	500	„
Sashi Bhusan De, Landowner	720	1940-45
Mrs. Madhuri Roy	500	1941
Alumni Association (Pavilion & Old Boys' Home)	18,000	„
Aryya Dharma Bhandar Ltd. (Jugal Kishore Birla)	5,000	„
Patit Paban De & Co., Builders	5,000	1942
Jugal Kishore Birla, Merchant	7,000	„
Miss Runu Roy	500	„
Rama Prosad Saha, Merchant	1,000	„
Sheshasayee Bros. Ltd., Trichinopoly	550	„
Kiron Chandra Roy, Engineer and Industrialist	3,000	1942-44
Sachindra Bhusan Datta, Engineer and Industrialist	1,300	1942-45

<i>Names</i>	<i>Rupees</i>	<i>Date</i>
Atul Chandra Datta, Engineer and Industrialist	7,000	1942-43
Ashutosh Ganguli, Merchant and Industrialist	1,000	1942-44
Hemendra Kumar Roy, Mg. Director, Bengal Electric Lamp Works Ltd.	1,250	..
Sen & Co., Electrical Dealers	818	1942-43
Prof. Sudhir Chakravarti	1,000	1942-44
Ratan Behari Datta, Engineer and Industrialist	500	1942-43
Sachindra Prosad Saha, Engineer and Industrialist	600	1942-43
G. A. Acharyya, Merchant, Mysore	500	1943
Sudhir Kumar Ghosh	550	..
Prof. Purna Chandra Ganguli	550	..
Calcutta Electric Co. Ltd.	648	..
Kumari Kumkum Bhowmik	830	..
Ramkumar Bhowalka, Merchant	500	..
Sree Narasingh Sahay Madan Gopal Elec. Co.	1,376	..
Amal Kumar Datta	500	..
Professor Dr. Triguna Sen, Principal, Jadavpur College	1,250	1943-44
Premier Engineering Co.	751	..
Kanti Datta, Naval Engineer	500	..
Jay Engineering Works Ltd.	1,500	1943-45
B. Ghosh	500	..
Lala Ratan Lal (Merchant)	500	..
Amarendra Nath Mukerjee, Iron & Steel Control Office	500	..
Bankim Chandra Mitra, Engineer, Port Commissioner	550	..
Himangshu Sekhar Sinha, Asst. Works Manager, Bengal Electric Lamp Works Ltd.	500	1943
Prof. Dr. Satish Chandra Bhattacharyya	500	..
Pravati Textile Mills Ltd.	500	..
Nripendra Kumar Roy, Industrialist	500	..

<i>Names</i>	<i>Rupees</i>	<i>Date</i>
Eastern Engineering Trading Co.	671	..
G. Achariya & Sons (Mysore)	10,000	..
Bala Bux Singhania, Merchant	1,000	..
Pioneer Engineering Co.	865	..
Pukhardas, Merchant (Lahore)	3,000	..
Devadatta Saroagi & Sons, Electrical Dealers	837	..
J. N. Electric Co.	749	..
Bhupendra Nath Banerjee, Industrialist	1,000	1944
Sasanka Sekhar Bagchi, Engineer & Contractor	500	..
Sisir Kumar Mitra, Electrical Contractor	500	..
Subhendu Sanyal, Engineer	500	..
Mrs. Kusum Kumari Roy (Mrs. Lalit Roy)	2,500	..
Dwijendra Lal Roy-Chowdhury, Industrialist	650	..
Amarendra Nath Haldar, Electrical Engineer & Industrialist	500	..
Oriental Electric Works	529	..
Pandey Electric Co. Ltd.	621	..
Chandra & Co.	501	..
Estate Bhola Nath Das (Chandernagar)	1,000	..
Debesh Chandra Ghosh, Tea Planter	500	..
Sardar Bahadur Sardar Indra Singh, Industrialist	2,000	..
Executor to the Estate of Gopal Chandra Sinha	32,000	..
Bhola Nath Kumar	500	..
Bimal Kumar Roy, Engineer, Bengal Electric Lamp Works	500	..
Dr. Charu Chandra Chatterjee, Builder & Contractor	1,000	1945
Malek Ram, Merchant	500	..
Kilachand Devchand & Co.	5,000	..
Surendra Nath Datta, Engineer & Builder	5,000	..
P. C. Mitra	1,000	..
Lt.-Col. Albert Mayer, Architect, New York	300	..

<i>Names</i>	<i>Rupees</i>	<i>Date</i>
Rabindra Nath Paul, Industrialist & Merchant	600	..
Capt. Dr. Haren Bose (Lucknow)	50,000	..
Mrs. Hemlata Tagore	2,200	..
Dr. Taraknath Das, Publicist and Professor, New York	800	..
Capt. U. C. Paul (Tipperah), Asst. Engineer, B. & A. Ry.	500	..
Chandra Sekhar Neogi, Electrical Engineer & Contractor	500	..
Darjeeling Jalpaiguri Tea Co. Ltd.	500	..
A Friend of Jadavpur College	10,000	1946

APPENDIX G

*Foreign-Schooled and/or Foreign-Factoried Jadavpurians (1910-45)**

I. 1910-19

<i>Name</i>	<i>Occupation</i>
Dr. Abinash Bhattacharya, 1910 (Germany)	Industrial Chemist, Calcutta.
Amulya Bose, 1910 (England)	Engineer, T.I.S. Co., Jamshedpur.
Hiron Gupta, 1910 (England)	Unknown.
Banshidhar Pal, 1910 (England)	Chief Exchange Engineer, Lahore Elec. Supply Co.
Dr. Jnan Das-Gupta, 1910 (Germany)	Manufacturer of Chemicals, Hamburg, Germany.

* In every instance the year indicates the class-year at Jadavpur (Bengal Technical Institute or Bengal National College). The description to the right indicates the profession or occupation known about 1945. The list is not complete.

Jadavpurians are those students who had regular schooling (primary, secondary or collegiate) at Bengal National College, Bengal Technical Institute or Jadavpur College for a somewhat long period.

<i>Name</i>	<i>Occupation</i>
Dr. Hiralal Roy, 1910 (U.S.A. & Germany)	Professor, Jadavpur College.
Jatin Set, 1910 (U.S.A.) ...	Director of Development and Industries, Mayur- bhanj State, Orissa.
Dr. Naren Sen-Gupta, 1910 (U.S.A.) ...	Professor of Experimental Psychology, Lucknow, (Deceased 1944).
Bejoy Sarkar, 1910 (U.S.A.)	Lecturer in Economics, Cal- cutta University.
Dhiren Sarkar, 1910 (U.S.A. and Germany) ...	Industrial Chemist (Deceased in London, 1940).
Suren Bal, 1910 (U.S.A.) ...	Curator, Industrial Section, Indian Museum, Cal.
Suren Datta, 1910 (England)	"Plycrete" Ltd., Calcutta.
Premananda Das, 1910 (U.S.A.) ...	Pharmacologist, Calcutta
Dr. Satyananda Roy, 1910 (U.S.A.) ...	Principal, Teachers' College, Calcutta Corporation (Deceased 1940)
Manoranjan Ghosh, 1910 (U.S.A.) ...	Engineer, Siemens-Schuck- ert (Deceased 1943).
Sukumar Roy, 1910 (Ger- many and England) ...	Tata Iron & Steel Co., Jamshedpur.
Banesvar Dass, 1911 (U.S.A. & Germany) ...	Professor, Jadavpur College.
Rajen Chowdhury, 1911 (U.S.A.) ...	Farm Management, Malda.
Khagen Mitra, 1911 (U.S.A.) ...	Journalism, Calcutta.
Nabin Das, 1911 (U.S.A.) ...	Businessman, South Caro- lina, U.S.A.
Biren Das-Gupta, 1911 (U.S.A. & Germany) ...	Electrical Engineer & Managing Director, Indo-Swiss Trading Co. Ltd., Calcutta.
Hemen Rakshit, 1911 (U.S.A.) ...	Businessman, New-York.

<i>Name</i>	<i>Occupation</i>
Jnanada Das-Gupta, 1911 (U.S.A.) ...	Asiatic Chemical Works, Calcutta. Deceased.
Suren Kar, 1911 (U.S.A. & Germany) ...	Journalism (Deceased in Germany).
Bankim Roy, 1911 (U.S.A.)	Electrical Engineer, Calcutta.
Suren Roy, 1912 (U.S.A.) ...	Managing Director, Bengal Belting Works Ltd.
Dr. Kshirod Majumdar, 1913 (U.S.A. and England) ...	Physical Research Dept. T.I.S. Co., Jamshedpur.
Dr. Indu Bose, 1919 (Germany) ...	School of Tropical Medi- cine, Calcutta.

II. 1920-29

Dr. Bata Ghosh, 1921 (Germany & France) ...	Lecturer in Linguistics, Calcutta University.
Hemen Roy, 1921 (Germany)	Mg. Director, Bengal Electric Lamp Works, Cal.
Dr. Jatin Basu, 1921 (Germany) ...	Professor, Jadavpur College.
Dr. Satish Bhattacharyya, 1921 (Germany) ...	Professor, Jadavpur College.
Subodh Bose, 1922 (U.S.A.)	Engineer, International G.E.C., Bombay.
Deben Chakravarti, 1923 (England) ...	Superintendent, Palmer Bridge Pumping Station, Calcutta.
Biraja Majumdar, 1924 (England) ...	Locomotive Engineer, N.W. Ry.
Hem Guha, 1924 (England) ...	Professor, Jadavpur College.
Mani Majumdar, 1924 (Germany) ...	Textile Expert, M. B. Majumdar & Co., Cal.
Nirpen Majumdar, 1924 (Germany) ...	Munition Fatories, Cawnpur.
Saral Adhikari, 1924 (England) ...	Electrical Engineer, Jharkhand Colliery, B.N. Ry.

Name	Occupation
Ugra Banerjee, 1924 (England)	Manufacturer of Lamp Machines.
Benoy Mitra, 1925 (England)	Chief Engineer, Surajmull Nagarmull & Co., Cal.
Dhiren Brahma, 1925 (England)	Lecturer, Imperial Institute of Sugar Technology, Cawnpur.
Madhu Majumdar, 1925 (U.S.A.)	Managing Director, Sakti Batteries, Calcutta.
Manmatha Chakravarti, 1925 (U.S.A. & Germany)	Professor, Jadavpur College.
Priya Gupta, 1925 (Germany)	Engineer, T. E. Thompsons & Co., Calcutta.
Saroj Mitra, 1925 (U.S.A.)	Manager, Deolai Electric Supply Co. Ltd., Nasik.
Sudhir Chakravarti, 1925 (U.S.A.)	Professor, Jadavpur College.
Dhiren Saha, 1926 (England)	Electrical Supervisor, Lighting Dept. Calcutta Corporation.
Karuna Guha, 1926 (England)	Dy. Director, Planning Board, Government of India, New Delhi.
Kiron Roy, 1926 (U.S.A.)	Managing Director, Oriental Mercantile Co. (Deceased October 1945).
Narayan Vidyarthi, 1926 (England)	Professor, Science College, Patna.
Dr. Triguna Sen, 1926 (Germany)	Principal, Jadavpur College.
Debnath Das, 1926 (Japan)	Businessman, Tokyo.
Hem Rauth, 1928 (England)	Naval Engineer & Architect, Garden Reach Workshop.
Dr. Jatin Mukerjee, 1929 (Germany)	Chemist, Tata Oil Mills, Tatapuram.
Santosh Jana, 1929 (U.S.A. & Sweden)	Canadian Aluminium Corpo- ration, Muri (B.N. Ry.).

<i>Name</i>	<i>Occupation</i>
Sudhir Datta, 1929 (Germany & England) ...	British India Construction Co., Calcutta.
III. 1930-39	
Niren Lahiri, 1930	Director, Indira Movietone.
Rashbehari De, 1930 (Germany) ...	Civil Supply Department, Calcutta.
Kali Jha, 1933 (Germany) ...	Chief Engineer, Darbhanga Electric Supply Co.
Gopal Sen, 1933	On study leave, proceeding to the U.S.A.
Ratan Datta, 1933. (Germany) ...	Manager & Director, Naso.
Satchidananda Sen, 1934 (Switzerland, Italy, Sweden) ...	Production Manager, Bengal Electric Lamp Works, Ltd.
Amiya Chatterjee, 1935	In Government service,—on study leave in the U.S.A.
Man Kumar Ghosh, 1935 (England)	Engineer, Ichapur Gun & Shell Factory.
IV. 1940-45	
Bimal Roy, 1940	On study leave in the U.S.A.
Mohi Mukerjee, 1943	On study leave in England.
Nalini Mukerjee, 1943	On study leave in England.
Nakuleswar Saha, 1945 ...	On study leave in England.

APPENDIX H

"Big Business" in Co-operation with Jadavpur College

A few large industrial establishments have decided to accord to the National Council of Education the privilege of getting several students of Jadavpur College "factorified" in their works for three months every year from April 15 to July 15. Graduates of Jadavpur College have likewise been accorded facilities of factory work by certain establishments. The nature and extent of this co-operation between "Big Business" and Jadavpur College is indicated below;*

* These arrangements are to come into force for the first time during the academic year 1946-47.

I. For Mechanical Engineering

Concerns	Training for 3 months
1. Burn & Co. (Howrah)	... 4 students.
2. Jessop & Co. (Dum-Dum)	... 2 ..
3. National Iron & Steel Co. (Belur)	... 4 ..
4. Jay Engineering Works (Tollygunge)	... 6 ..
5. Star Iron Works (Lillooah)	... 4 ..
6. Maya Engineering Works (Belur)	... 10 ..
7. Kesoram Cotton Mills (Kidderpore)	... 10 ..
8. Port Engineering Works (Nazirgunj)	... 12 ..
9. Mohini Mills No. 2 (Panighati)	... 2 ..
10. D. K. Das & Co. (Howrah)	... 2 ..
11. Gresham & Craven (Entally)	... 2 ..
12. Braithwaite & Co. (Kidderpore)	... 4 ..
13. Steel Corporation of Bengal (Burnpur)	... 2 ..
14. Tata Iron & Steel Works (Jamshedpur)	... 1 ..
15. Birla Jute Mills (Birlapur)	... 3 ..

II. For Electrical Engineering

Concerns	Training for 3 months.	Training for Graduates
1. Calcutta Electric Supply Corporation Ltd.	2 students	1 year's training for one graduate
2. Calcutta Corporation	6 students	1 year's training
3. Calcutta Tramways Co., Ld.	—	1 year's training for two graduates
4. Siemens (India) Ltd.	5 students	1 year's training for 2 graduates
5. Telegraph Workshops (Alipore)	4 students	—
6. Associated Electrical Industries Ltd.	2 students	—
7. Octavius Steel Co. (Dacca Electric Supply Co.)	2 students	1 year's training for 2 graduates
8. East Indian Railway	—	6 months' training
9. Steel Corporation of Bengal (Burnpur)	2 students	—

Concerns	Training for 3 months	Training for Graduates
10. Tata Iron & Steel Co. (Jamshedpur)	2 students	Jadavpur graduates are eligible for the graduate-apprenticeship course of the Tisco,

III. For Chemical Engineering

Concerns	Training for 3 months
1. Bangaluxmi Soap Works	...
2. Jadavpur Soap Works	...
3. National Soap Works	...
4. Assam-Bengal Cement Works (Sylhet)	...
5. Andhra Paper Mills (Rajamundry)	...
6. Calcutta Chemical Co.	...

APPENDIX I

Alumni Association of the N.C.E., Bengal

I. Presidents, Treasurers and Secretaries

(1921-1945)

A. 1921-1931

1. Inaugural Meeting held on 16th January, 1921. For the year 1921,—President: Dr. Abinash Bhattacharya, Ph.D. (Berlin), Techno-Chemical Laboratories, Konnagar. Treasurer: Jatin Set, A.B. (Harvard). Secretaries: Prof. Hiralal Roy, A.B. (Harvard) and Upen Ghosh (Bangiya Diasalai Karyalaya, Match Factory).
2. First Annual General Meeting, held on 15th January, 1922. For the year 1922,—President: Dr. Abinash Bhattacharya, Ph.D. (Berlin). Treasurer: Jatin Set, A.B. (Harvard). Secretaries: Prof. Hiralal Roy, A.B. (Harvard) and Upen Ghosh (Bangiya Diasalai Karyalaya, Match Factory).
3. Second Annual General Meeting, held on 31st December, 1922. For the year 1923—President: Satis Banerjee (Chemist). Treasurer: Jatin Set, A.B. (Harvard). Secretaries:

Prof. Hiralal Roy A.B. (Harvard), and Upen Ghosh (Bangiya Diasalai Karyalaya Match Factory).

4. Third Annual General Meeting held on 10th February, 1924. For 1924-25,—President: Prof. Dr. Naren Sen-Gupta, Ph.D. (Harvard). Treasurer: Jatin Set, A.B. (Harvard). Secretaries: Prof. Suren Roy, M.E.E. (Harvard) and Asst. Prof. Jagat Paul.
5. Fourth Annual General Meeting held on 6th September, 1925. For 1925-26,—President: Prof. Dr. Naren Sen-Gupta, Ph.D. (Harvard). Treasurer: Jatin Set, A.B. (Harvard). Secretaries: Prof. Suren Roy, M.E.E. (Harvard) and Asst. Prof. Jagat Paul.
6. Fifth Annual General Meeting, Records missing. For 1926-27,—President: Jatin Set, A.B. (Harvard). Treasurer: Prof. Dr. Naren Sen-Gupta, Ph.D. (Harvard). Secretaries: Prof. Banesvar Dass B.S.Ch.E. (Illinois) and Instructor Moni Datta, A.M.M.E. (Jad.).
7. Sixth Annual General Meeting, Records missing. For 1927-28,—President: Jatin Set, A.B. (Harvard). Treasurer: Prof. Dr. Naren Sen-Gupta, Ph.D. (Harvard) Secretaries: Prof. Banesvar Dass, B.S.Ch.E. (Illinois) and Instructor Moni Datta, A.M.M.E. (Jad.).
8. Seventh Annual General Meeting, Records missing For 1928-29,—President: Satyaranjan Roy, A.M.Ch.E. (Jad.) Chemist Treasurer: Prof. Banesvar Dass, B.S. Ch.E. (Illinois). Secretaries: Instructor Manmatha Chakravarti, B.Sc. (Cal.) A.M.E.E. (Jad.), and Advocate Jiten Banerjee M.A., B.L.
9. Eighth Annual General Meeting, Records lost. For 1929-30,—President: Satyaranjan Roy (Chemist). Treasurer: Prof. Banesvar Dass, B.S.Ch.E. (Illinois). Secretaries: Instructor Deben Chakravarti, A.M.E.E. (Jad.), elected on 10th August 1930 in place of Manmatha Chakravarti, B.Sc. (Cal.), A.M.E.E. (Jad.) who proceeds to the U.S.A., and Advocate Jiten Banerjee, M.A., B.L.
10. Ninth Annual General Meeting, held on 14th September, 1930. Elected for 1930-31,—President: Dr. Satyananda Roy (Meadville, U.S.A.). Treasurer: Harsha Mukerjee (Engineer-Contractor). Secretaries: Lecturer Deben Chakravarti,

A.M.E.E. (Jad.), and Sashi Sen, A.M.Ch.E. (Jad.), (Bengal Chemical & Pharmaceutical Works, Ltd.)

B. 1931-1941

11. Tenth Annual General Meeting, held on 6th September, 1931. Elected for 1931-32,—President: Dr. Satyananda Roy (Meadville, U.S.A.). Treasurer: Harsha Mukerjee (Engineer-Contractor). Secretaries: Lecturer Deben Chakravarti, A.M.E.E. (Jad.) and Kamini Majumdar, A.M.E.E. (Jad.) (A.B. Ry.).
12. Eleventh Annual General Meeting, held on 25th September 1932. Elected for 1932-33,—President: Upen Ghosh (Bangiya Diasalai Karyalaya, Match Factory). Treasurer: Harsha Mukerjee (Engineer-Contractor). Secretaries: Lecturer Deben Chakravarti, A.M.E.E. (Jad.) and—.
13. Twelfth Annual General Meeting, held on 10th September 1933. Elected for 1933-34,—President: Dr. Satya Roy (Meadville, U.S.A.). Treasurer: Harsha Mukerjee (Engineer-Contractor). Secretary: Lecturer Jatin Palit, A.M.M.E., A.M.E.E. (Jad.).
14. Thirteenth Annual General Meeting, held on 16th September 1934. Elected for 1934-35,—Prof. Hem Das-Gupta, B.M.E. (Michigan). Treasurer: Harsha Mukerjee (Engineer-Contractor). Secretary: Asst. Prof. Sudhir Chakravarti, B.S. (Worcester), M.S. (Michigan).
15. Fourteenth Annual General Meeting, held on 17th September. Elected for 1935-36,—President: Prof. Hem Das-Gupta, B.M.E. (Michigan). Treasurer: Harsha Mukerjee, Secretary: Asst. Prof. Sudhir Chakravarti, B.S. (Worcester), M.S. (Michigan).
16. Fifteenth Annual General Meeting, held on 27th September 1936. Elected for 1936-37,—President: Harsha Mukerjee (Engineer-Contractor). Treasurer: Dr. Kshirod Majumdar, Ph.D. (Harvard and London). Secretary: Mani Majumdar (Chemnitz, Germany), Dealer in Textile Machineries and Dyes.
17. Sixteenth Annual General Meeting, held on 26th September, 1937. Elected for 1937-38,—President: Harsha Mukerjee (Engineer-Contractor). Treasurer: Dr. Kshirod Majumdar,

Ph.D. (Harvard and London). Secretary: Lecturer Hari Ganguli, A.M.M.E. (Jad.).

18. Seventeenth Annual General Meeting, held on 18th September, 1938. Elected for 1938-39.—President: Barada Gupta (Geologist), Treasurer: Dr. Kshirod Majumdar, Ph.D. (Harvard and London). Secretary: Asst. Prof. Sudhir Chakravarti, B.S. (Worcester), M.S. (Michigan).

19. Eighteenth Annual General Meeting, held on 10th September, 1939. Elected for 1939-40.—President: Barada Gupta (Geologist), Treasurer: Dr. Kshirod Majumdar, Ph.D. (Harvard and London). Secretary: Instructor Gopal Sen, A.M.M.E. (Jad.).

20. Nineteenth Annual General Meeting, held on 22nd September, 1940. Elected for 1940-41.—President: Jatin Set, A.B. (Harvard), Treasurer: Kamini Majumdar, Secretary: Dina Bhaumik, A.M.M.E. (Jadavpur), (A.B. Ry.).

C. 1941-1945

21. Twentieth Annual General Meeting, held on 14th September, 1941. Elected for 1941-42.—President: Jatin Set, A.B. (Harvard). Treasurer: Prof. Hiralal Roy, A.B. (Harvard), Dr. Ing. (Berlin). Secretary: Asst. Prof. Sudhir Chakravarti, B.S. (Worcester), M.S. (Michigan).

22. Twenty-first Annual General Meeting, held on 18th April, 1943. Elected for 1943.—President: Suren Datta B.Sc. (Glasgow). Treasurer: Prof. Hiralal Roy, A.B. (Harvard), Dr. Ing. (Berlin). Secretary: Prof. Sudhir Chakravarti, B.S. (Worcester) M.S. (Michigan).

23. Twenty-second Annual General Meeting, held on 9th April, 1944. Elected for 1944.—President: Prof. Suren Roy, M.E.E. (Harvard). Treasurer: Prof. Hiralal Roy, A.B. (Harvard), Dr. Ing. (Berlin). Secretary: Prof. Sudhir Chakravarti, B.S. (Worcester) M.S. (Michigan).

24. Twenty-third Annual General Meeting, held on 15th April, 1945. Elected for 1945.—President: Prof. Suren Roy, M.E.E. (Harvard). Treasurer: Prof. Banesvar Dass, B.S.C.H.E. (Illinois). Secretary: Lecturer Gopal Sen, A.M.M.E. (Jad.), proceeding to the U.S.A. for advanced study, replaced by Prof. Hem Guha, A.M.E.E. (Jad.), B.Sc. (Edin.).

II. *Executive Committee of the
Alumni Association, 1945*

President :—

Prof.-Emeritus Suren Roy, M.E.E. (Harvard), Class 1912.

Treasurer :—

Prof. Banesvar Dass, B.Sch.E. (Illinois), Class 1911.

Secretary :—

Lecturer Gopal Sen, A.M.M.E. (Jad.), Class 1933, replaced by Prof. Hem Guha, A.M.E.E. (Jad.), B.Sc. (Edin), Class 1924.

Accountant :—

Lecturer Deben Chakravarti, A.M.E.E. (Jad.), Class 1923.

Auditor :—

Asst. Prof. Jagat Paul, Proficiency (N.C.E.), Class 1911.

Members :—

Sudeb Datta, A.M.E.E. (Jad. 1930) (Lighting Supervisor, Calcutta Corporation). (2) Prof. Manmatha Chakravarti, B.Sc. (Cal.), A.M.M.E. (Jad. 1925), B.S. (Worcester), M.S. (Michigan). (3) Sasanka Bagchi, A.M.E.E. (Jad. 1923) (Electrical Contractor). (4) Sachin Datta, B.Sc. (Cal.), A.M.Ch.E. (Jad. 1935) (Oriental Mercantile Co.). (5) Himangshu Sinha, A.M.M.E. (Jad. 1934), Bengal Electrical Lamp Works. (6) Netai Mallik, A.M.M.E. (Jad. Class 1935), (Jessop & Co.). (7) Bhupen Banerjee, Class 1935 (Oriental Mercantile Co.). (8) Sisir Mitra, A.M.E.E. (Jad. 1935), (Electrical Contractor). (9) Susanta Chatterjee, A.M.E.E. (Jad. 1929), (Electrical Contractor). (10) Sachin Ghosh, A.M.E.E. (Jad., 1937), C/o Nursingsahai Madangopal Ltd. (11) Venkateswar Achari, A.M.E.E. (Jad. 1940), C/o Office of the Director General Shipbuilding and Repairs. (12) Jiten Roy, A.M.E.E. (Jad. 1941). (13) Ranjit Sen, A.M.E.E. (Jad. 1942). (14) 1943—vacant. (15) Suresh Mukerjee, Class 1944. C/o S. K. Chakravarti Ltd.

III. *Consulting Educationists (Hon'y.)*
 (Elected 17 November, 1945)

1. Dr. Tarak Das, Ph.D., Professor and Publicist, New York.
2. Lt.-Col. Albert Mayer, Engineer and Architect, New York.
3. Prof. Benoy Sarkar, M.A., *Vidya-Vaibhava* (Benares),
 Dr. h.c. (Tehran), Calcutta.

IV. *Finance Committee of the Alumni
 Association, 1945**

(Estd. 7, December, 1941)

President :—

Jatin Set, A.B. (Harvard).

Treasurer :—

Prof. Hiralal Roy, A.B. (Harvard), Dr. Ing. (Berlin).

Secretaries :—

1. Sachin Datta, B.Sc. (Cal.), A.M.Ch.E. (Jadavpur), Oriental Mercantile Co. Ltd.
2. Atul Datta, A.M.Ch.E (Jadavpur), Jadavpur Soap Works.

Members :—

1. Sasanka Bagchi, Electrical Contractor,
2. Prafulla Banerjee, Kalimpong Elec. Supply Co. Ltd.
3. Amulya Bose, B.Sc. (Mich.),
4. Prof. Manmatha Chakravarti, B.Sc. (Cal.), A.M.E.E. (Jadavpur), B.S. (Wor.), M.S. (Purdue),
5. Prof. Sudhir Chakravarti, A.M.E.E. (Jadavpur), B.S. (Wor.), M.S. (Mich.),
6. Susanta Chatterjee, Electrical Contractor,
7. Dhiren Das-Gupta,
8. Prof. Banesvar Dass, B.S.Ch.E. (Illinois)
9. Ratan Datta, Nasco Ltd.
10. Sudeb Datta, Lighting Department, Calcutta Corporation,
11. Suren Datta, B.Sc. (Glasgow), Plycrete Ltd.
12. Nihar Datta-Roy, Indian Steel & Wire Products Ltd.,
13. Ashutosh Ganguli, Iron and Hardware Merchant,
14. Moni Ghosh,
15. Karuna Guha, A.M.Ch.E. (Jadavpur), M.S. (Liverpool),

Deputy Director, Planning Board, New Delhi, 16. Saroj Guha, Bengal Electrical Lamp Works Ltd., Bombay Branch, 17. Akul Lahiri, Electrical Contractor, 18. Netai Mallik, Electrical Merchant, 19. Bankim Mitra, Electrical Engineer, Port Commisioner, 20. Sisir Mitra, Electric Contractor, 21. Kiron Roy, A.M.E.E. (Jadavpur), B.S. (Mass. Inst. Tech. Boston), 22. Prabhat Roy, A.M.M.E. (Jadavpur), 23. Sukumar Roy, Superintendent, Coke Oven, Tisco, Jamshedpur, 24 Suren Roy, M.E.E. (Harvard), Bengal Belting Works Ltd., 25. Sachin Saha, Bharat Battery Manufacturing Co. Ltd.

*V. Silver Jubilee Fund Committee
of the Alumni Association, 1945*
(Estd. 4 August 1945)

Prof. Suren Roy (1912), Sasanka Bagchi (1923), Hara Chakravarti (1924), Phani Datta (1924), Prof. Hem Guha (1924), Chandra Niyogi (1924), Prof. Manmatha Chakravarti (1925), Prof. Sudhir Chakravarti (1925), Bankim Mitra (1925), Prafulla Banerjee (1926), Dr. Triguna Sen (1926), Atul Datta (1928), Sudeb Datta (1930), Sudhir Ghosh (1930), Dhiren Ghosh (1931), Subhendhu Sanyal (1932), Bejoylal Sarkar (1932), Himansu Sinha (1934), Kumar Bose (1935) Sachin Datta (1935), Sisir Mitra (1935), Dinen Nandi (1935), Akul Lahiri (1939), Sisir Bose (1943), Suresh Mukerjee (1944).

*VI. Publicity Bureau of the
Alumni Association, 1945*
(Estd. 17 November 1945)

Members

1. Sasanka Bagchi, A.M.E.E. (Jadavpur), Contractor and Merchant, 2. Prafulla Banerjee, Managing Partner of H. K. Banerjee & Sons, Narayanganj (Dacca), 3. Atul Datta, A.M.Ch.E. (Jadavpur), Proprietor, Jadavpur Soap Works, 4. Ratan Datta, A.M.Ch.E. (Jadavpur), Director, Nasco. 5. Sachin Datta, B.Sc. (Cal.), A.M.Ch.E. (Jadavpur), Director, Oriental Mercantile Co., Ltd. 6. Amar Haldar, A.M.E.E. (Jadavpur), Principal, Institute of Engineering Technology, and Director, Development of Indus-

tries, Ltd. 7. Moni Majumdar. 8. Prof. Prabhat Roy, M.Sc., *Secretary*, 9. Professor-Emeritus Suren Roy, M.E.E. (Harvard), Managing Director, Bengal Belting Works Ltd. 10. Secretary Alumni Association, Prof. Hem Guha, A.M.E.E. (Jadavpur) B.Sc. (Edin.), 11. Dr. Triguna Sen, A.M.M.E. (Jadavpur) Dr. Ing. (Munich), Principal, Jadavpur College.

Adviser

Professor Benoy Sarkar, M.A., *Vidyavaibhava* (Benares),
Dr. h.c. (Tehran)

VII. *Foreign Education Committee of the
Alumni Association, 1945**

(Estd. 17 November 1945)

Members

1. Dr. Rafi Ahmed, D.D.S. (Iowa), 2. Sachin Banerjee, B.Sc. (Glas.), 3. Prof. Jatin Basu, Dr. Ing. (Berlin), 4. Prof. Satish Bhattacharyya, Dr. Ing. (Berlin), 5. Kshitish Biswas, M.S. (M.I.T.), 6. Suren Bose, M.S. (Calif.), 7. Prof. Sudhir Chakravarti, B.S. (Wor.), M.S. (Mich.), 8. Biren Das-Gupta, B.S. (Purdue), 9. Prof. Banesvar Dass, B.S.Ch.E. (Ill.), 10. Prof. Shib Dev, DR. ES. SC. (Paris), 11. Suren Datta, B.Sc. Hons. (Glas.), 12. Prof. Hem Guha, B.Sc. (Edin.), 13. Karuna Guha, M.Sc. (Liverpool), 14. Dr. Kshirod Majumdar Ph.D. (Harvard), Ph.D. (London.), 15. Dr. Moni Moulik, D.Sc. pol. (Rome), 16. Dr. Ananta Pandya, D.Sc. (M.I.T.), 17. Aboni Roy, M.A., B.Com. (Edin.), 18. Prof. Atul Roy, B.Sc. Hons. (Glas.), 19. Prof. Suren Roy M.E.E. (Harvard), 20. Prof. Satyen Sen, B.Sc. (Sheffield), 21. Prof. Shiva Sen, B.A. Hons. (London), 22. Dr. Triguna Sen, Dr. Ing. (Munich), 23. Jatin Set, A.B. (Harvard), 24. Prof. Nandlal Shah, M.S. (M.I.T.), 25. Dr. Amulya Ukil, M.B., M.S. P.E. (Paris), 26. Prof. Narayan Vidyarthi, M.Sc. (Liverpool).

Secretaries

1. Prof. Hira Lal Roy, A.B. (Harvard), Dr. Ing. (Berlin),
2. Prof. Manmatha Chakravarti, B.S. (Worcester), M.S. (Purdue).

* See pp. 64-65.

APPENDIX J

*Kiron Roy Memorial Committee**
(Estd. 2 November 1945)

Patrons

1. Dr. Bidhan Chandra Roy, M.D., M.R.C.S., F.R.C.P. (London),
2. Dr. Shyama Prasad Mukerjee, Ph.D., Bar-at-law.

President

Dr. Anant Hari Pandya, D.Sc. (M.I.T., Boston), Deputy Director, Military Supplies, Government of India.

Treasurer

Gaganvihari Mehta, Scindia Steam Navigation Co. Ltd.

Secretary

Sachindra Bhusan Datta, B.Sc. (Cal.), A.M.Ch.E. (Jadavpur), Director, Oriental Mercantile Co. Ltd.

Members

G. A. Acharya, Banker and Merchant, Bangalore; Dr. Rafi Ahmed, D.D.S., (Iowa), Principal, Calcutta Dental College and Hospital; Sasanka Bagchi, A.M.E.E. (Jadavpur), Contractor and Merchant; Sachin Bandopadhyay, B.Sc., (Glasgow), Chief Engineer (Actg.), Calcutta Improvement Trust; Bhupen Banerjee A.M.E.E. (Jadavpur) Merchant; Prafulla Banerjee, Managing Partner of H. K. Banerjee & Sons, Narayanganj (Dacca); Naren Bhaduri, Managing Partner, India Moulding Co.; Kshititis Biswas, M.S. (M.I.T.), Provati Textile Mills Ltd.; Amulya Bose, B.S.; (Mich.) Superintendent of Energy and Economy, Tisco (Jamshedpur); Biren Bose, Retd. Executive Engineer, Director, Oriental Mercantile Company, Bombay Branch; Suren Bose, M.Sc. (Calif.), Bengal Water-proof Works Ltd.; Prof. Manmatha Chakravarti, B.Sc. (Cal.), A.M.E.E. (Jad.), B.S. (Wor.), M.S. (Purdue), Jadavpur

* See pp. 63—64. There is a change in the Treasurer's name in the new constitution as subsequently drawn up.

College; Prof. Sudhir Chakravarti, A.M.M.E. (Jadavpur), B.S. (Wor.), M.S. (Mich.), Jadavpur College; Khub Chand, Merchant and Banker, Karachi; Girdharilal Damodar Das, Merchant, Ahmedabad; Dr. Tarak Das, Publicist and Professor, New York; Biren Das-Gupta, B.S.E.E. (Purdue), Managing Director, Indo-Swiss Trading Co. Ltd.; Atul Datta, A.M.Ch.E. (Jadavpur), Proprietor, Jadavpur Soap Works; Phani Datta, A.M.E.E. (Jadavpur), Jamshedpur; Ratan Datta, A.M.Ch.E. (Jadavpur), Director, Nasco Ltd.; Suren Datta, B.Sc. (Glasgow), Managing Director, Plycrete Ltd.; Sudeb Datta, A.M.E.E. (Jadavpur), c/o Calcutta Corporation; S. K. Datta; Tarak Datta, M.A., Calcutta Mills Agency & East Bengal Society; Dr. Shub Sundar Deb, Dr. es Sciences (Paris), Lecturer in Geology, Jadavpur College; Mohanlal Ganguli, B.Sc. (London), Statistician, Indian Jute Mills Association; Dr. Hemen Ghosh, M.B. (Cal.), M.S.P.E. (Paris), Standard Pharmaceutical Works Ltd.; Manoranjan Ghosh, A.M.E.E. (Jadavpur), Asst. Elec. Engineer, Tisco. (Jamshedpur); A. C. Guha, Prof. Hem Chandra Guha, A.M.E.E. (Jadavpur), B.Sc. (Edin.), Jadavpur College; Saroj Guha, A.M.E.E. (Jadavpur), B.E.S.T. Co. Ltd. (Bombay); Amar Haldar, A.M.E.E. (Jadavpur), Principal, Institute of Engineering Technology, and Director, Development of Industries Ltd.; Prof. Humayun Kabir, M.L.C; Devi Prasad Khaitan, General Manager, Birla Bros. Ltd.; Lt.-Col. Albert Mayer, Architect, New York; Dr. Moni Moulik, D.Sc. pol. (Rome), Indian Tea Market Expansion Board; Pukhardas, Merchant, Lahore; Dr. Atma Ram, D.Sc. Central Glass and Ceramic Research Institute, Jadavpur; M. G. Ravel, Merchant, Bombay; Benoy Rohatgi, Managing Director, India Electric Works Ltd.; Hemen Roy, A.M.E.E. (Jadavpur), Oriental Mercantile Co. Ltd.; Professor Suren Roy, M.E.E. (Harvard), Bengal Belting Works Ltd.; Dwijen Roy-Chowdhury, Director, Oriental Mercantile Co. Ltd.; Riten Roy-Chowdhury, of J. N. Roy-Chowdhury & Co., Chittagong & Calcutta; Prof. Meghnad Saha, D.Sc., F.R.S. (London); Prof. Benoy Sarkar, Dr. h.c., Dhriten Sen, M.L.A. President, Glass Manufacturers' Assn.; Prof. Triguna Sen, Dr. Ing. (Munich), Principal, Jadavpur College; Professor Nandlal Shah, M.S. (M.I.T.), Jadavpur College; Dr. Amulya Ukil, M.B. (Calcutta), M.S.P.E. (Paris), Chest Department, Medical College Hospitals, Calcutta; Ramesh Vin, Manager, Oriental Mercantile Co. Ltd., Bombay Branch.

*Donations promised at the Memorial Meeting
on the Jadavpur Campus (2 Nov. 1945)**

1. Bengal Electric Lamp Works Ltd., of which Kiron Roy was the Technical Director	... Rs. 20,000
2. Oriental Mercantile Co. Ltd., of which Kiron Roy was the organizer and Managing Director	... .. .. 20,000
3. Brothers & relatives of Kiron Roy	... .. .. 10,000
4. The Alumni Association, National Council of Education, Bengal, of which Kiron Roy was a leading member	... .. .. 10,000
5. Teaching Staff of the College of Engineering & Technology, at Jadavpur, of which Kiron Roy was an Alumnus and the Secretary of the Managing Committee	... .. .. 1,000
6. Prafulla Kanta Banerjee (Engineer & Con- tractor, Narayanganj, Dacca)	... .. .. 1,000
7. Sachindra Bhusan Datta (Oriental Mercantile Co. Ltd.)	... .. .. 1,000
8. Atul Chandra Datta (Jadavpur Soap Works)	... .. .. 1,000
9. Ratan Behari Datta (Nasco)	... .. .. 1,000
10. Birendra Nath Das-Gupta (Indo-Swiss Trading Co.)	... .. .. 1,000
11. Surendra Mohan Bose (Bengal Water- proof Works Ltd.)	... .. .. 1,000
12. Lt.-Col. Albert Mayer, New York	... .. 500
13. Sudeb Chandra Datta (Light Supervisor, Calcutta Corporation)	... .. .. 100
14. Arabinda Ukil, A.M.Ch.E. (Jadavpur)	... .. .. 100
15. Jitendra Nath Chakravarti	... .. .. 25
16. Riten Roy-Chowdhury (of J. N. Roy- Chowdhury & Co. Chittagong and Calcutta)	... .. .. .. 25
17. Tarak Datta (of Calcutta Mills Agency and East Bengal Society)	... .. .. .. 25

* See p. 64. The total figure given there is Rs. 74,000 on the basis
of newspaper reports.

INDEX I. SUBJECTS

Abolitions and retrenchments, 279-282

Activities of the Teaching Corps, Preface, 215-217

Additional establishments, 263-266

Addresses of Jadavpurians, 119-122, 137-143, 162-168, 192-194, 345-349

Administration, 27-30, 113-116, 329-333

Admission Requirements at Jadavpur, 298, 328

“Adoption,” by Big Business, 22, 277-278, 285, 349-351; of Jadavpur professors by Americans, 317

Afghanistan and Jadavpur, 320

Agricultural Course, 11, 16

Agriculture Professors, 25, 337

Alumni Association, 5-7, 36-40, 49, 51, 56, 58, 59, 60, 62, 64, 66, 134, 212, 248, 256-258, 281, 287, 289-291, 296, 299-301, 304-309, 317, 342, 345-349, 351-361

Alumni procession, 66, 251

Alumnification, 30-31, 40, 250, 251, 305, 310-314

American, economic planning, 170; Base Hospital, 323; gifts to N.C.E., 53; interest in India, 317; publications, 227, 241; recognition, 62-63; technological institutes, 155, 179-187, 297-299

Applied economics, 266-268

Appreciation, of Kiron Roy, 308-309, of Naren Sen-Gupta, 102-110, Preface

Aristocracy of industrialism, 311

Arthik Unnati (Economic Progress) Monthly, 240

Ashu Chowdhury's Manifesto, 72-74

Assessment of Jadavpur, 268-271

Athletics and sports, 21

Auditors of the N.C.E., 330

B.A. Curriculum of Indian Universities, 273

Background for a Greater Jadavpur, 271-274

Banking for Engineers, 15, 54

Basu-Mallik, Profesors and Fellows 330-331

Beginnings 1905-1909, 43-45, 245-246, 254-255

Bengal, Chemical and Pharmaceutical Works, 286; National Chamber of Commerce 50-52, 229-231, 240, 241; National College, 94-99, 100-109; Technical Institute, 86-90, 94-99, 110-112

Bengali Revolution, 69-72, 245-246, 252, 254-255, 305, 310-311

Bengali Institutes of Economics, Sociology, International Relations, etc. 230-231, 240

Berlin and Jadavpur, 28-29, 49, 50, 82, 88, 110, 220-222, 226, 241, 320, 334, 335

Bhaumik-Ganguli Report, Preface, 58, 279, 307

"Big Business," 13, 22, 232, 277, 282-284, 285-288, 349-351
"Blue Earth" Workshops, 62, 287, 323, 324
Boom in Indian industry, 176
Bourgeoisie, medieval and modern, 30, 311, 322, of technocracy, 311
Boycott, of British goods, 43, 49, 70; of schools, 70-74.
British, degrees, 25; economic planning, 170, 174; recognition, 46, 50, 66; technological institutes, 155; war effort, 194-198
Buildings and College, 297-299
Calcutta Corporation and N.C.E., 50, 51, 54, 134, 248, 256, 341, 342
Calcutta University, 4, 43, 52, 72-73, 95-97, 99
Calendar of the N.C.E., 79, 81
California Institute of Technology, 183, 186
Campus, 34-35
Capitalism, medieval and modern, 30, 311
Carnegie Institute of Technology, 62, 183, 298
Celebrities of 1920-29, 157-160
Central Institute of Technology, 294-296
Challenge to Young India, 271
Chemical Engineering, 13, 14
Chemical Engineering Professors, 226-231, 335-336
City and Guilds of London Institute, 47, 50
Civil disobedience movement, 53, 226, 249
Clive Street, 278
College of Applied Economics and Social Work, 266-268
Committees of the N.C.E., 331
Complaints, 262-263
Conservatoire des Arts et Métiers, 6, 152, 320
Consulting Educationists of the Alumni Associations, 356
Convocation, 61, 62, 66, 251
Cornell University, 62, 298
"Creative disequilibrium," 314
Creative Forces in the Evolution of Jadavpur College, 245-252
Creative India, Preface
Culture combined with "mistrification," 17-18
Dawn Society and N.C.E., 71, 75-76, 101, 255, 310, Preface
Decades of Jadavpur College, 46-48, 49-53, 53-57, 57-66, 245-252, 339-345, 345-349, 351-354
Defects of Bengali students, 286-287
Degrees, conferred by N. C. E., 11, 251; *honoris causa*, 302-304
Demobilization a challenge to Jadavpurians, 296, 304-309
Despotocracy in administration, 307-308
Deutsche Akademie, 52, 53, 225, 290
Development Department, 300-302
Doctors of engineering, 289-290, 299
Donations for honorary degrees, 303-304
Donors and donations, 85-86, 90-91, 114, 339-345, for Kiron Roy Memorial, 63-64, 361
Draftsmanship Teachers, 337
Dynamic Factors, 254-259

Economic planning and war-preparations, 169-175

Economics for Engineers, 15, 266-268

Economics Professors, 237-242.

Edinburgh University, 50, 225, 237, 320 334, 337

"Education through work", Preface

Educational theory, 5, 8, 47

Electrical engineering, 12, 13

Electrical Engineering Professors, 225, 226, 334-335

Engineering economics, 15, 266

Engineers of India at Jadavpur, 317-319

Executive Committee, of Alumni Association, 355; of N.C.E., 29, 30, 76-77, 86-87, 332

Evolution of Jadavpur College, 43-66, 245-252, 317-324

Executive Committee, of Alumni Association; of N.C.E. 29, 30, 76-77, 86-87, 332

Exhibitions, 45, 54-55

Expansions and initiations, 279-282

Expenditures and Receipts of N. C. E., 338

Experimental psychology in India, 102, 109

Experts' Committee, 57, 58, 279

Extension lectures, 44, 45, 49, 57, 60

"Factorification," 3-6, 64, 224, 238, 283-288, 318, 323, 324, 349

Famine of 1943, 23, 216

Fathers of national education, 4, 44, 81-85, 110-113, 245, 246, 252, 253, 309, 310, 329-331

Fifty-day factorification, 283-285

Fifty lakhs in five years, 276-279

Fifty Percent of Student Population, 274-276

Finance Committee of the Alumni Association, 59, 356

Finances, 31-33, 113-117, 187, 263, 277-278, 300, 338

Financial estimates for expansion, 281

First Fruits of N.C.E., 129-134

Five-Year Plan for Jadavpur, 276-279

Folk-literature and folk-art, 108

Foreign Education Committee, 64-65, 254, 290, 358

Foreign (Modern) languages and cultures, 266, 337

Foreign-schooled and foreign-factoried, 27, 132, 158, 191, 288-291, 299, 317, 320

Foreign-schooled Jadavpurians, 345-349

Foreign Training for two-thirds of teachers, 288

Founders' Day, 61

France and Jadavpur, 232-235, 241, 319, 320

French, as a subject of instruction, 82, 266, 299, 337; Central Africa, 321; doctorate, 25; economic planning, 171-172; publications, 233-235, 241; scholars visiting Jadavpur, 319-320; technological institutes, 152-153; technology to be represented at Jadavpur, 320.

"General Department," 29, 236, 321, 331

Geology Professor, 232-235

German as a subject of instruction, 82, 266, 299, 337; doctorates, 25; economic planning, 173-174; publications, 241-242; technological institutes, 153-155; war-effort, 194-198

Germany, and N.C.E., 49-50, 52, 221-229, 240-242, 248; to be de-industrialized, 269

Girls' professional education, 274

Glasgow and Jadavpur, 28-29, 89, 111, 225, 237, 238, 320, 334

Glib talk of an "Indian M.I.T." 297-299

Government grants, Preface, 59, 282, 311, 314

Government of India, 56, 57, 58, 62, 294-296

Govindram Sakseria Charity Trust, 63, 223

Graduate Schools, 298

"Great Power" Standard, 151-156

"Greater India" and Young Jadavpur 252-254

"Greater India" Society, 53-55, 57

Greater Jadavpur, 271-282, 283-288, 288-304, 307-309, 312

Gymnasium, 21, 59

Harvard University, 46, 183, 226, 247, 248, 320, 334, 335

Hem Basu-Mallik Professors, 330

Higher Engineering Students, 205, 328

History Professor, 238

Hony. Degrees, 302-304

Hostels, 263-264, 278

Humanism and "mistrification," 17-18 ..

Humanities Professors, 235-242, 337

Ideologies of B.T.I. 91-93.

Illinois University, 186, 228, 320, 335

Immediate requirements, 259-268

Imperial College of Science and Technology, 66, 298, Preface

Improvements in teaching, 260-262

India in American Business and Universities, 317

"Indian M.I.T." 297-299

Indo-American Association, 323

Indo-China and Jadavpur, 319-320

Industrial achievements of Jadavpur, 119-122, 137-143, 157-160; 162-168, 187-191, 192-194, 209-210, 268-269, 305-306, 310-311; India (1910-45), 119-122, 137-143, 162-168, 192-194

Industrialization of India, 125-129, 145-146, 176-179, 198-203; through Education, 11-16

"Inflated Employment", 198-203

Inflation in engineer-output, 204

Initiations and Expansions, 279-282

Institution of Engineers at Jadavpur, 318

International Science, 293-294

Inventions and discoveries, 143-145, 173, 196-198, 291

Iran and Jadavpur College, 321

Italian, publications, 242; technological institutes, 155

Jadavpur, and Central Institute, 294-296; and Indian Technological Education, 147-150; as seen by Jadavpurians, 161-162, 191-192, 210-212; by the world-standard, 268-271, to be rendered Greater, 271-312, Preface

Jadavpur Campus, 34-35
 Jadavpur College as an "Indian M.I.T.", 297-299; as an Instrument of Industrialization, 11-16 thro' French eyes, 319-320
 Jadavpur tradition, 305
 Jadavpur *vis-à-vis* U.S.A., 179-187
 Jadavpurian=Industrialist and Business Organizer, 306
 Jadavpurians, as new élites, 311-312; as peers and colleagues of pioneers, 30-31, 36-40, 256-257, 345-349, 351-361; by the world-standard 268-271; first decade, 119-122; furnish Secretary of N.C.E., Preface; looking back, 161-162, 191-192, 210-212; second decade, 137-142; third decade, 162-168
 Japanese technological institutes, 156
Journal of the College of Engineering and Technology, 22-23, 51, 56, 242
 Kabul and Jadavpur, 320
 Key-men, 254-259, 308
 Kiron Roy, Memorial Committee, 63-64, 309, 359-361; as Jadavpurian, 308-309
Kultur Kampf, 94, 98
 Labour economics, 266, 337
 "Labour-Engineers" 198
 Lags of India, 269, 272
 Laos and Jadavpur, 321
 Lawyers, 77, 87, 115, 125, 270, 311, 313
 Liquidation Authorities (American), Preface, 63, 223
 London and Jadavpur 66, 238, 298, 320, 337
 M.I.T. and Jadavpur, 25, 27-29, 63-65, 222, 226, 320, 335
 Machine consumption, 126-128
 Madnesses of Kiron Roy, 308
 Malda District Council of National Education, 5, 46, 108, 246, 247
 "Managerial Revolution", 198
 Managing Committee, 27-29, 115, 332
 Manufacture of Machines, 128-129
 Marwari businessmen, 269
 Massachusetts Institute of Technology, 62, 184, 186, 222, 298, 320
 Mathematics Professors, 217-220, 336
 Mechanical engineering, 12
 Mechanical Engineering Professors, 220-224, 334
 Medical practitioners, 77, 87, 115, 125, 313
 Method of the present study, 1-8
 Michigan University, 46, 62, 184, 186, 298
 Millionaires of the U.S.A. 317
 Mining, 232-235, 280
 "Mistrification", 3-6, 17-18, 78, 81-85, 95-98, 169, 176-178, 206-207, 222, 246, 247, 271, 275-276
 Modern (Foreign) Languages and Cultures, 266, 337
 Moneyed *vs.* unmoneyed, 314
 Music and play, 19, 23
 N.C.E., as the Dawn Society "writ large", 75-76
 Naren Sen-Gupta as N.C.E. alumnus, 102-110
 "National lines" in education, 96, 99
 Nationalist India embodied in Jadavpur College, Preface

New Admissions, 328

Non-cooperation movement, 49, 247

“Nursification”, 169, 271, 275, 276

Oil-technology, 51, 229-231, 248

“Over-production” 198-203

Paris and Jadavpur, 56, 59, 88-89, 113, 232-235, 240-241, 320, 331, 337

Partition of Bengal, 69

Pattern of finance and administration, 113-116

Pavilion, 21, 56, 58

Pedagogic, necessity, 283-285; paraphernalia of N.C.E. 100-109

Pedagogics of technocracy, 5, 8, 47

Period 1940-45, 57-66

Physical Culture Instructors, 337

Physics Professors, 336

Pioneer of experimental psychology in India (Naren Sen-Gupta a Jadavpurian), 102, 109

Pioneering by Jadavpurians, 123-125, 129-134, 137-143, 157-160, 192-194, 209-10

Pioneers of “Mistrification”, 81-85 110-113, 245-246, 254-255, 310

Planning, as an exercise in multiplication, 274; of World-war II, 169-175

Post-Graduate Studies, 273

Power-politics in educational institutions, 313-314

Pre-Matric standard, 275

Presidents of the N.C.E. 329

Presidents, Treasurers and Secretaries of the Alumni, 351-354

Principals of Jadavpur College, 332

Probodh Basu-Mallik Fellows, 331

Procession of Alumni, 66, 251

Profesors approaching Big Business for factorification, 62, 64, 223, 225, 318, 324, 349-351

Preface

Progress of a Techno-Economic Primitive, 125-128

Propaganda Department, 301, 302

Publications of the N.C.E. 47, 48, 49, 50, 52, 53, 54, 56, 59, 217-224

Publicity Bureau of the Alumni Association, 357-358

Purdue (University, 130, 225, 320; 335

Qualifications of Professors, 24-27, 215-242, 291-294, 299, 333-337

Rangpur National School, 71-72, 103

Rationalization, 144, 173-174, 196-198

Raw materials manufactured in laboratories, 173

Receipts and Expenditures of N.C.E., 338

Recognition abroad, 46, 47, 50, 62, 66, Preface

Rectors of the N.C.E. 330

Religious instruction, 18

Renaissance of the N.C.E., 40, 134, 249

Reports of the N.C.E., 4-7, 31-33, 48, 57, 80, 98, 116, 256, 302

Reports of the Society for the Promotion of Technical Education, 91-94

Research, in engineering, 291-292, in science and culture, 95-96, 202-203

Retrenchments, 279-282

Rising Engineers and Technologists, 187-191

Rivalries due to age and money, 313-314

Royal Asiatic Society of Bengal, 321

Russian technological institutes, 156, 208-209

Salaries, 26, 32-33, 117-119

Salaries and College, 297-299

Schaffendes Volk Exhibition, 173,

School-Pattern, 1-2

Science Congress and N.C.E. 48, 50, 56, 317-319

Scope of the Present study, 1-8

Secretaries of the N.C.E., 329

Self-Sacrifice and Martyrdom, 117-118

Sheffield University, 224, 320, 334

Shibpur College, 125, 149, 181-182

Shiksha-Vijnan (Science of Education), 5, 8, 47

Shortcomings of Jadavpur, 161-162, 191-192, 210-212

Silver Jubilee of the Alumni Association, 36, 134, 290, 306

Silver Jubilee Fund Committee of the Alumni Association, 357

Social Relations Sub-committee of Science Congress, 273

Social Work, 266-268, 276, Education for Women, 169, 271, 274-276 (See Nursification)

Society for the Promotion of Technical Education, 44, 46, 91, 94-100, 255

Socio-Economic Significance of N.C.E. scholars, 123-124

Spirit of Jadavpur, 305

Students, and Passes at Jadavpur 19-24, 147, 148, 179-180, 204-206, 295, 327; of higher engineering, 205, 328

Sturdy Jadavpurians during demobilization, 304-309

Substitutes, 174, 197

Superintendents of Jadavpur College, 333

Survey Teachers, 337

Swadeshi movement, 2, 70-72

Swaraj, 2, 51, 97, 247

Teachers, of Technology old and new, 110-113; to be trained abroad, 288-291, 299, 317, 320

Teaching, *Corps*, 24-26, 81-85, 88-89, 110-113, 215-221, 333-337; in need of improvements 260-262

Tech., 19-21, 220

Technical education, in France, 152-153; in Germany, 153, 155; in India, 76-80, 147-150, 181-182; in Italy, 155; in Japan, 156; in Russia, 156; in the U.K. 155; in the U.S.A. 155, 182, 187, for fifty per cent of student population, 274-276

Technikums, 208, 275

Technische Hochschule, 49, 50, 52, 221, 224

Techno-Economic, India on the eve of world-war II. 176; Primitive in progress, 125-128

Technological Education at B.N.C. 76-80

Techno-Scientific Background, 271-274

Time-table, 11,

Total "alumnification", 310-314

Treasurers of the N.C.E. 330

Trustees of the N.C.E. 329

Tug-of-war between B.N.C. and B.T.I. 94-99

Tours and excursions, 21

Twelve Dynamic Factors, 254-259

Two-thirds of teaching personnel to possess foreign qualifications, 288-291

University-boycott, 72

U.S.A. and N.C.E., 46-48, 53

U.S.A. degrees, 25

Visitors, 45, 46, 47, 51, 52, 61, 64, 317, 318, 319, 320, 321

Vishwa-Bharati, 133

Wanted fifty lakhs in five years, 276-279

War, Ecology of Jadavpur College, 204-209; economy and inflation, 198-203; efforts of England and Germany, 194-198; preparations and Economic planning, 169-175

Watumull Foundation, Preface, 62, 290

Women's professional (social work) education, 169, 271, 274, 275, 276

Worcester Polytechnic Institute, 53, 185, 186, 320, 334, 335

World-technocracy, 143-144

World-War I, 48, 129, 143, 247

World-War II, 54, 169-176, 176-179, 194-198, 250

World-War III in preparation, 296

Yale University, 46

Young Jadavpur, 19-23, 252-254, 285-288

Younger Jadavpurians, 308

Youngest lions among Jadavpurians 209-210

Zamindari bourgeoisie, 30, 311, 322, Preface

INDEX II. PERSONS

Achari, Venkateswar, 355

Acharya, G. A., 60, 62, 343, 344; 359; G. K., 318; G. R., 318.

Pran, 43, 87; Shashi, 329, 330; Snehansu, Preface, 29, 330; Suren, 342; Surya, 44, 69, 85, 86, 246, 310, 329, 339

Adalja, P. P., 318

Adhikari, Saral, 347

Agarwal, P. R., 318

Agarwalla, Dhannu, 85, 114, 339

Ahmed, Rafi, 65, 358, 359

Allen Charles, 45

Alumni Association, 342

Anand, Banarsilal, 188

Antia, D. P., 318

Arnama, Man, 47

Arya Dharma Bhandar Ltd., 342

Asahi, 145

Ash, Col. 63, 223

Astier, 153

Atkinson, R. E., 47

Atma Ram, 360

Aurobindo, 103, 106, 107

Axelrad, E., 321

Azad, Abul, 60, 66

Babulal Rajgarhia, 321

Bagal, Jogesh, 69

Bagchi, Jagadis, 189; Kali, 87, 91; Probodh, 54; Sasanka, 28, 30,

37, 159, 257, 332, 344, 355, 356, 357, 359, Preface

Bajoria, 320

Bake, A. (Dr. & Mrs.) 321

Bal (Bal Gangadhar Tilak), 2, 45

Bal, Suren, 110 131, 346

Balmer Lawrie, 285

Banerjee, Barun, 210; Bhupen, 36, 257, 344, 355, 359; Gooroodas, 43, 44, 45, 71, 75, 77, 84, 85, 104, 114, 115, 246, 255, 310, 339; Gopal, 23, 216, 335; Hari, 334; Jiten, 58, 352; Kashinath, 210; Kedar, 340; Kishori, 210

Mani, 82, 110, 113, 333; Nil, 190; Nripen, 104; Phani, 189; Pravfulla, Preface, 28, 31, 36, 159, 250, 257, 342, 356, 357, 359, 361; Purnendu, 336, Rameswar, 65; Gangadhar, 287; Ratan, 45; Sachin, Preface, 28, 29, 58; 65, 250, 257, 337, 358, 359; Sambhu, 132; Satis, 351; Suren, 43, 69, 71, 84; Ugra, 160, 347

Upen, 336

Baral, Bhabani, 83

Barman, Bhagavan, 189; Sudhakar, 210

Basu-Mallik, Anadi, 334; Hem, 18, 44, 45, 48, 49, 51, 52, 236, 330-331, 332; Probodh, 18, 47, 50, 51, 52, 54, 56, 59, 236, 331; Satis, 340

Batas, the 285

Baykov, A. 175

Bentley, A. C. 256

Bertrand, L. 232

Bevin, 207

Bhaduri, Chandra, 87, 88; Naren, 359

Bhanjdeo, Ram, 339

Bhatnagar, Shanti, 22, 203

Bhattacharya, Abinash, 36, 49, 110, 130, 345, 351; Ambika, 104; Charu, 334; Durga, 105; Heramba, 18, 337; Joy, 157; Kartik, Manomohan, 75, 77, 115, 255; Mohini, 103; Pulin, 334; Ramesh, 82; Manoranjan, 133; Sachin, 287; Satis, Preface, 28, 37, 50, 216, 220, 221, 248, 324, 333, 334, 343, 347, 358

Bhaumik, Dina, 354, Hari, Preface, 23, 28, 29, 57, 58, 60, 250, 257, 279, 301, 318; Miss Kum-kum, 343

Bhowalka, Ram, 343

Bhup, Nripen, 339

Birds, the, 286

Birla, Ghanashyam, 61, 140, 159; Jugol, 59, 342

Birlas, the, 278, 285, 286

Birprotap, Sris, 341

Bishi, Nalini, 340

Biswas, Charu, 27, 29, 56, 58, 330, 331; Gagan, 115; Kshitish, 65, 287, 323, 358, 359; Nara, 82; Purna, 29, 216, 332, 336

Blum, 172

Bodh Gaya, Mohanta, 91, 340

Bohr, H. 217

Bose, Abani, 188; Amiya, 219, 334; Amulya (student) 19, Amulya (engineer), 345, 356, 359; Ananda, 71; Atul, 36, 342; Balai, 189; Basanta, 86, 330; Biren, 359; Deben, 227; Dharrani 256; Durga, 341; Girish, 43, 78; Gopi, 341; Hara, 334, Haren, 345; Hari (teacher),

110; Hari, 91; Haricharan, 340; Haridas, Hriday, 89, Indu, 347; Ishan, 330; Jagadis, 79, 87, 320; (Basu) Jatin, Preface, 28, 50, 221-222, 248, 294, 324, 334, 347, 358; Jyotish, 89; Keshab, 190; Kshirode, 189; Kumar, 188, 357; Nirode, 82, Pramathā, 37, 78, 86, 88, 123, 246, 310, 330, 332, 341; Prasanna, 81, 82; Pratap, 318; Raj 78; Rashbehari 110; Sachin, 70, 104, Sarat, 66, 330; Satya, Preface, 27, 29, 86, 113, 115, 250, 329, 331; Satyen, 61; Sisir, 357; Subhas, 23, 53, 55, 56, 61, 256, 324; Subodh, 347; Suren, Preface, 28, 65, 287, 323, 358, 359, 361

Bothra, Punyavant, 190

Brahma, Dhiren, 348

Brahmabandhab, 71, 72

Brahmachari, Arabinda, 190

Brown, J. J., Major, Preface, 64

Bruhl, Paul, 45, 87

Burns, 278, 285, 286

Cajori, F. 217

Calcutta Electric, Co., 343

Chakko, K. C., 318

Chakladar, Haran, 76, 82, 107

Chakravarti, Bibhuti, 188, 216, 336; Bipin, 82; Braja, Byomkesh, 43, 77, 85, 90, 114, 339; Deben, 157, 216, 335, 347, 352, 353, 355; Dhiren, 110; Dwarka, 340, Hara, 357; Hem, Jiten, 361; Jnanada, 83; Manmatha, Preface, 28, 53, 65, 225, 250, 257, 293, 323, 335, 348, 352, 355, 356, 357, 358, 359; S. K. & Sons, Ltd., 355; Satis, Preface, 216-220, 248, 249, 250, 291, 292, 293, 336; Subodh, 336; Sudhansu, 332; Sudhir, Preface 21, 28, 36, 53, 59, 190, 216, 222, 249, 257, 324, 334, 343, 348, 353, 354, 356, 357, 358, 359; Sudhir (Navadvip), 159; Suren, 318; Susil, 88, 89, 110, 112, 113, 333

Chalfant, R. W., Lt., 64

Chand, Khub, 359

Chanda, Bimal, 216, 335

Chandra & Co., 344

Chase, 145

Chatterjee, Abani, 89; Abinash, 115, 256; Ajeyasree, 190; Amiya, 62, 190, 290, 349; Ananga, 334; Bankim, 106; Bhavadev, 91; Bhim, 111, 113, 246; Brahma, 55; Charu, 344; Deb, 190; Jogini, 91; Kishori, 210; Mohini, 45, 330, 340; Moni, 341; Promod, Preface; Sachi, 190; Satis, 18; Suniti, 54, 57; Susanta, 157, 257, 339, 355, 356

Chatopadhyaya, Kamala, 61

Chowdhury, Ashrafuddin, 66; Ashu, 43, 48, 49, 50, 71, 74, 75, 77, 85, 90, 114, 246, 255, 310, 329, 330, 339; Bonowari, 87; Charu, 331; Deben, 287; Girin, 82; Gopal, 340; Jnan, 91; Jogesh, 330; Kailash, Rajen, 132, 346; Sudhin, 336; Tara

Chunder, Ganesh, 43

Clark, 175

Classes of 1925, 1926, 1935, 342
 Clives, the, 278, 285
 Coochbehar, Maharaja, 90, 114
 Coomaraswamy, Ananda, 45, 108
 Coondoo, Lakshmi, 336
 Cornell, W. B., 267
 Corporation of Calcutta, 341, 342
 Coulon, R., 88, 89, 110, 113, 246
 Cox, Col. 64
 Cromack, B., Capt., 64
 Curiot, H., 153
 Dalal, Ardeshir 61, 203, 232
 Darjeeling Jalpaiguri Tea Co., 345
 Das, (Dass) Banesvar, Preface, 28, 39, 46, 50, 105, 130, 228, 229, 230, 231, 247, 248, 256, 292, 323, 324, 335, 346, 352, 354, 355, 358; Bhola, 344; Bhudeb, 210; Binod, 334; Bokhan (correct name Pukhardas) 60; Chittaranjan, 43, 49, 51, 54, 247, 248, 256; Deb, 348; Girdharilal Damodar, 360; Girin, 334, 337; Laxmi, 163, 190; Jatish, 323; Makhan, 334; M. L. and Sons, 163; Nabin, 132, 346; Premananda, 130, 189, 345; Pulin, 106; Ranjit, 189; Sarat, 45; Saroj, 103; Satis, 90; Tarak, Preface, 53, 290, 345, 356, 360; Woopen, 111

Das-Gupta, Amal, 133; Aswini, 89; Bhabes, 189; Biren, 50, 130, 323, 346, 358, 360, 361; Brahmananda, 190; Dhiren, 356; Hem, 46, 110, 113, 115, 247, 333, 353; Jatin, 89, 246, 253; Jnan, 132, 345; Jnanada, 131, 347; Kali, 17, 18, 48, 49, 54, 58, 115, 236-237, 331; Kha-gen, 337; Khagen (chemist), 287, 323; Mohit, 56; Savanta, 209; Subodh, 337; Sudhir, 335

Dash, A. J., 321
 Dass, Alamohan, 157, 287
 Datta, Amal, 36, 343; Ashim, 331; Atul, Preface, 29, 30, 36, 157, 250, 257, 317, 343, 356, 357, 360, 361; Balai, 91; Bidhu, 52, 331; Bijan, 189; Dhiren, 331; Dilip, 336; Hemen, 286, 287; Hiren, 43, 45, 72, 75, 77, 85, 104, 115, 246, 255, 279, 301, 310, 329, 339; Jayada, 82; Jyotish, 157; Kali, 157, Kanti, 36, 343; Kshitish, 29; Kumar, 115, 341; Mahendra, 256; Manoranjan, 188; Moni, 352; Nalinaksha, 54; Naren, 287; Phani, 357, 360; Ratan, 37, 188, 336, 343, 349, 356, 357, 360, 361; S. K., 360; Sachin, Preface, 29, 30, 36, 59, 62, 64, 188, 342, 355, 356, 357, 358, 361; Sarat, 37, 88, 89, 246, 253, 332; Shib, 255, 322; Sudeb, Preface, 28, 30, 36, 59, 257, 331, 355-357, 360, 361; Sudhir, Preface, 28-30, 157, 257, 349; Sunil, 131; Suren, 29, 36, 131, 250, 323, 344, 346, 354, 356, 358, 360; Tarak, 360, 361

Datta-Roy, Nihar, 157, 356
 Davids, Rhys, 107
 Dawn, Murari, 210
 Dawoods, the, 278, 285
 Dawson, T. S., 47
 De-Mahendra, 82; Pannalal, 85, 339; Patit, (P. P.) 59, 157, 342;

Prabhas, 104, 334; Rashbehari, 28, 349; Sastri, 342; Satis, 36, 342

Deb, Dhiren, 335; Satya, 65, 89, 287; Shib, Preface, 60, 216, 232-235, 251, 253, 293, 337, 358, 360; Sukumar, 191

Denning, A. Du Pre, 47

de Pindray d' Ambelle, Capt. and Mme, 321

Destombes, M., 320

Devadatta Saroagi & Sons, 344; Deuskar, Sakharam, 81, 82, 105

Devi, Rani Kusum Kumari; Saroj Kumari, 91

Dhar, Bhola, 341; Gaur, 188; Hariram, 159

Dighapatia, Raja of, 90

Doré, M., 321

Dunlops, the 286

Durant, Lt. Commander, 321

Dye, H., Capt., 321, 322

Eastern Engineering Trading Co., 344

Eberlin, R., Col., Preface, 64, 323

Edison, 228

Ellis, C., 229

Engineer, Mr., 318

Everett, W. H., 45

Fermor, Louis, 321

Folks, 170

Forkner, S., Lt. 321

Fouchet, C. 319

Fraser, 123

Galvin, T., Capt. 64, 322, 324

Gandhi, Mohandas, 49, 60, 226, 247; W., 318

Ganguli, Ashu, 61, 332, 343, 356;

Dhiren, 331; Hari, 334, 354. Mohanlal, 360; Monmohan, 256; Prabhat, 68, 69; Purna, Preface 57, 58, 111, 113, 115, 246, 249, 279, 301, 333, 343; Shib, 133

Gaynor, Col., 63, 223

Gerold, E. F., Lt. Col., Preface

Ghandy, Jahangir, 64

Ghatak, Hem, 82

Ghosh, Ajen, 29, 331; Ajit, 89; Amulya, 82; Amulya (Mech, engineer) 334; Arabindapra-kash, 82; Asok, 335; Aurobindo, 44, 77, 78, 81, 82, 103, 105, 106, 246, 255, 303, 310, 330, 332; B., 343; Bata, 18, 52, 56, 59, 331, 347; Bimal (chemist) 210; Bimal (economist), 352; Bepin (Justice), 330; Bepin (of Malda), 46; Bishnu, 58; Charu, 91; Dayal, 235; Deb (engineer), 210; Debesh, 61, 344; Deva (Principal), 219; Deva (archaeologist), 54; Dhiren, 357; Guru, 225; Hari, 341; Hemen, 360; Mrs. Jayasri, 56, 342; Jnan, 227, 292, 319; Jogesh, 89; Kali, 341; Lalit 340; Lalmohan, 70; Man, 190, 349; Manoranjan, 346, 360; Mati, Preface, 43; Moni, 356; Protul, 188; Pro-mode, 189; Rabi, 76, 81, 82, 107; Rashbehari, 33, 39, 43, 44, 49, 76, 78, 83, 85, 86, 90, 104, 114, 246, 247, 255, 258, 310, 329, 340, 341; Sachin, 355; Sudhir, 37, 343, 357; Suren, 32, 56; Upen, 132, 351, 352, 353

Ghoshal, Durga, 105; Jyotsna, Subodh, 255

Girdharilal Damodardas, 360
 Glover, J. G., 267
 Gordon, B. L., Col., Preface, 323
 Göring, 173
 Goswami, Kristo, 89, 110; Kunja, 57; Suren, 103
 Guha, A. C., 360; Anath, 91; Hari, 341; Hem, Preface, 21, 28, 37, 39, 58, 64, 216, 225, 249, 257, 323, 334, 347, 355, 357, 358, 360; Jitesh, 331; Karuna, 65, 158, 348, 356, 358; Kedar, 54; Saroj, 357, 360; Satis, 133
 Guin, Prasad, 83
 Gupta, Akshay, 91; Aswini, 111; Atul, 105; Barada, 354; Hiron, 345; Kishori, 76, 82, Krishna, 90, 340; Nalini, 103; Panna, 318; Priya, 348; Ranada, 44; Tamohar, 157; Umesh, 71
 Haldar, Amar, Preface, 29, 30, 37, 59, 159, 250, 257, 344, 357, 360
 Hardikar, J. C., 318
 Havell, 108
 Hardie, Keir, 45
 Hayashi, T., 217
 Hill, A. V., 61
 Hirsh, 144
 Hitler, 54
 Hogan, L., Lt., 321
 Huda, Shamsul, 87
 Huq, Fazlul, 228, 329
 Hussain, Dildar, 318
 Ickes, H., 170
 Imam, Ali, 90
 Ispahanis, the, 278, 286
 J. N. Electric Co., 344
 Jadavpur Estate Ltd., 342
 Jana, Santosh, 158, 348
 Jardine, Skinners, the, 285, 286
 Jay Engineering Co., 343
 Jayaswal, Kashi, 108
 Jernigan, O. M. Col., Preface, 64, 323
 Jessops, the, 286
 Jha, Kali, 190, 349
 Jones, Capt., 63, 223
 Jones, William, 321
 Joshi, P. N., 318
 Jugalkishore, Baldeo das, 341
 Jung, Nawab Zain Yar, 318
 Kabir, Humayun, 360
 Kalidasa, 108
 Kane, G. P., 228, 319
 Kapoor, Radha Vallabh, 210; Radha Shyam, 210
 Kar, Mriganka, 335; Nilratan, 188; Radha, 43; Suren, 132, 347
 Karpeles, S., 319-320, 321, 322
 Kautalya, 107, 108
 Kavya-Purantirtha, Kedar, 81
 Kent, S., Major, 321
 Khaitan, Devi, 360
 Khanna, D. K. 318
 Khare, Daji, 47
 Khub Chand, 359
 Kilachand Devchand & Co., 344
 Kindavong, Prince, 321
 Kosambi, Dhammananda, 82, 83, 107
 Kohzad, Ahmed Ali, 320, 321
 Kotwal, Y. N., 318
 Kuehne, 153
 Kumar, Bhola, 37, 344
 Kundu, Mahendra, 157
 Kundu, Sushil, 210
 Kutar, P. H., 318
 Lacombe, O., and Mme, 319, 321

Lacroix, A., 233
 Lahiri, Akul, 36, 342 (not Atul);
 Niren, 349, 357; Sarat, 340;
 Ram, 110
 Lainé, B., 321
 Lal, Ratan, 343; (Lala Lajpat
 Rai), 2, 45
 Lalbhai, Kastur, 61
 Lall, Tilak, 90, 340
 Law, Ambika 340; Chandi, 340;
 Kristo, 340; Naren, 51, 232, 240,
 249, 287; Reshee, 340
 Laws, the, 278, 286
 Leedham, C. L., Col., Preface, 323
 Leverone, E., Capt., 321, 322
 Levin, Max, Major, 64
 Levy, P., and Mme, 319, 321, 322
 Loeb, 173
 Loesch, F. N., 322
 Lüders, H., 52
 Mahatab, Uday, 61
 Mainuddin; Maulvi, 81
 Maitra, Heramba, 43
 Major, L. S., Capt., 64, 322
 Majumdar, Ambika, 69; Bibhuti,
 334; Biraja, 347; Broti, 189;
 Haren, 337; Kamini, 353, 354;
 Kshirod, 132, 347, 353, 354, 358;
 Madhu, 158, 348; Moni, 157,
 257, 332, 347, 353, 358; Nages,
 Nripen, 347
 Malaviya, Madan, 302
 Melek, Ram, 344
 Mallik, Deben, 115; Indu, 82;
 Netai, 331, 355, 357; Nirod, 341;
 Subodh, 33, 43, 44, 85, 246,
 255, 258, 310, 329, 339; Suren, 89
 Mandal, Biren, 56; Benoy, 337;
 Prokash, 335
 Manikya, Bikrom, 339; Radha,
 339
 Marsh, C. S., 183
 Marshall, Norman (not Normal), 53
 Martins, the, 285, 286
 Matthai, John, 23, 62
 Mayer, Albert, Col., Preface, 61,
 64, 323, 344, 356, 360, 361
 Mayurbhanj, Maharaja, 90, 114
 McConkie, H. S., Col., Preface
 Mehra, Bhim, 159
 Mehta, Dr. 318; Gaganvihari, 359
 Melzeltin, 224
 Metzler W. H., 217
 Misra, Moti, 91
 Mitra, Bankim, 36, 59, 257, 343,
 357; Benoy, 348; Brajen,
 91; Charu, 115; Himanshu,
 318; Jogen, 54, 331; Jyotish,
 90; Khagen, 132, 346; Krishna,
 70; Manmatha, 86, 90, 114, 330,
 340; Naren, 28, 90, 114; P. C.,
 344; Panchanan, 54; Probhash,
 87, 91; Prafulla, 88, 91; Pra-
 matha, 43; Sain, 86, 90, 114,
 340; Saroj 348; Sasi, 43, 77;
 Satis, 91; Sisir, 28, 30, 37, 159,
 163, 257, 344, 355, 357; Suhrit,
 102
 Modak, N. V., 318
 Modi, (of Modinagar), 320
 Mohanta Maharaja, 91, 340
 Moulik, Moni, 65, 358, 360
 Muir, Thomas, 217
 Mukerjee, Amar, 36, 343; Asutosh, 99, 302; Binod, 287; Haren,
 336; Haridas, 69, 255, 322;
 Harsha, 331, 352, 353; Janaki,
 333; Jatin, 158, 348; Jatish, 323;

Jnan, 226, 292; Kshirod, 91; Kshiti, 255; Kshitish, 82, 111; Moni, 62, 349; Nalini, 62, 210, 336, 349; Narayan, 189; P. B. (B.T.I.), 87; Peary, 43, 84; Prabhat, 51, 133, 331; Prabhat, (storywriter) 104, Pramatha, 48, 49, 53, 82, 235, 236, 329, 331; Priya, 330; Radhakamal, 103, 107, 330; Radhakumud, 45, 46, 47, 76, 81, 82, 105, 107, 108, 109, 341; Rajen, 44, 86, 90, 114, 339; Ramaprasad, 29, 249; Rishi, 91, 333; Satis, Preface, 18, 43, 71, 75, 76, 77, 78, 81, 82, 101, 104, 105, 107, 108, 133, 245, 255, 303, 310, 332, 333, 340; Satyen, 107; Syamaprasad, 57, 66, 249, 359; Sudhir, 20; Suresh, 355, 357

Munshi, Kalimuddin, 114

Mymensingh, Maharaja, 90

Nag-Chowdhury, Basanti, 60

Naidu, Sarojini, 61

Nandi (Chemist), 319; Manindra, 44, 70, 81, 85, 90, 114, 246, 310, 339; Dinen, 357

Nath, Amares, 190

Natore, Maharaja, 90

Nawaz, Shah, Major-General, 324

Nawn, Sudhir, 287

Nazimuddin, 228

Nehru, Jawaharlal, 23, 52, 66, 227

Nivedita, Sister, 71

Niyogi (Neogi), Chandra, 37, 345, 357

Noble, Margaret, 71

Noronha, Frances, 317; G. 317

Nursing Sahaya, Madangopal, 60

Nyayalankar, Chandra, 81, 83, 107, 332

Oriental Electric Works, 344

Palit, Hari, 108; Jatin, 335, 353; Loken, 90, 339; Rakhal, 110, 113; Tarak, 43, 44, 71, 86, 90, 114, 246, 255, 310

Panday Electric Co., 344

Pandya, Anant, 63, 358, 359

Paradkar, Baburao, 82, 105

Paranjpye, Raghunath, 109; V. K., 82, 83, 84, 246

Paul (Pal), Aswini, 110, 334, Bansidhar, 133, 345; (Pal), Bipin, 2, 43, 69, 72, 106, 330; Gopeswar, 103; Haren, 105; Jagat, 28, 216, 219, 220, 336, 352, 355; Jahar, 21, 216, 337; K. (Geologist), 235; Nalin, 249, 331; Rabi, 345; Ramani, 89, 111; Tarini, 188; U. C., Capt., 345

Peel, G., 171, 172

Peer, Murton, 64, 317

Pioneer Engineering Co., 344

Plotkin, S., 208

Pouchoy, Lt. and Mme, 321

Pramanik, Amar, 216, 336

Prasad, Jagannath, 54, 341

Pravati Textile Mills Ltd., 343

Premchand, 285

Premier Engineering Co., 343

Pukhardas, 344 (wrongly spelt as Bokhan Das) 360

Punnananda, Bhikkhu 81, 82, 105

Qureshi, M., 318

Rai, Lala Lajpat, 2, 45

Rajgarhia, Babulal, 321

Rakshit, Hemen, 131, 346, Hrishi-kesh, 59, Nagen, 83, 84, 85, 115, 246

Ram, Atma, 360; Malek, 344
 Ramakrishna, 18, 69, 71, 168
 Ramchandran, T. M., 57
 Ranade, B. B., 82, 84, 246
 Rasul, Abdul, 43, 75, 77, 85, 114, 246, 255, 310, 329, 340
 Rauth, Hem, 348
 Ravel, M. G., 360
 Ray and Ray, 330
 Razavy, S. M., 321
 Rigal, Lt. Col., 321
 Rohatgi, Benoy, 360
 Roy, Abani, 237, 238, 337, 358; Akshaya; Amitabha, 210; Amiya, 210; Arthur, 82; Atul, 223-224, 253, 334, 358; Bankim, 131, 347; Bidhan, Preface, 29, 54, 256, 329, 359; Bimal, 37, 62, 131, 344, 349; Braja, 104; Dwijen, 106; Govinda, 77; Hemen, 36, 131, 343, 347, 360; Hiralal, Preface, 22, 28, 36, 46, 49, 50, 56, 59, 64, 65, 103, 105, 110, 113, 115, 130, 216, 226-227, 228, 247, 248, 249, 250, 253, 256, 292, 293, 317, 323, 333, 335, 342, 346, 351, 352, 354, 356, 358; Jagadindra, 341; Jagadindu, 82, 110, 112, 113, 115, 333; Jiten, 355; Jnan, 77, 85, 114; Kiron, Preface, 27, 29, 36, 59, 62, 63, 64, 131, 159, 188, 250, 257, 308-309, 323, 332, 342, 348, 357, 358 359, 360, 361; Mrs. Kusum-Kumari, 61, 344; Lalit, 131, 342; Mrs. Madhuri, 342; Nibaran, 89; Nihar, 54, 57; Nripen, 37, 131, 343; Prabhat, 190, 335; Prabhat (Professor), 216, 357, 358; Prafulla, 79, 87, 88, 106, 329, 330, 342; Pramatha, 337; Prasanna, 76, 84; Pratap, 334; Prithwis, 69; Priyada, 227; Promoda, 339; Ramakanta, 70, 104; Romen, 287; Miss Runu, 342; S. K. (Geologist), 235; Sarat, 340; Satyananda, 33, 256, 346, 352, 353; Satyaranjan, 352; Subimal, Sukumar, 132, 346, 357; Suren, Preface, 29, 36, 39, 56, 58, 131, 139, 188, 228, 247, 248, 256, 287, 293, 319, 322, 323, 329, 333, 334, 342, 347, 352, 354, 355, 357, 358; Surendra Mohan, 321; Suresh, 36, 341
 Roy-Bardhan, Danindra, 335
 Roy-Chowdhury, Biren, 321, 322, 332; Brajen, 18, 29, 33, 44, 75, 85, 86, 115, 246, 255, 258, 303, 310, 322, 329-330, 339; Dwijen, 344, 360; Girija, 69; Jogen, 340; Kailash, 339; Kshirod, 210; Pramatha, 91; Rebati, 210; Riten, 360, 361; Yatin, 77, 85, 114, 330, 339
 Roys, the, 278, 286
 Sadananda (Swami), 55
 Sadhukhan, Prabhat, 335
 Saha, Dhiren, 348; Gaur, 189; Meghnad, 227, 292, 360; Nakul, 62, 349; Rama, 342; Sachin, 36, 59, 188, 257, 343, 357
 Sahagal, A. C., 223
 Sahoo, Matilal, 158
 Sakseria, Govindram, 63, 223
 Sakuja, Hariram, 133
 Samaddar, Krishna, 89
 Samadhyayi, Mokshada, 71, 81, 105
 Samajpati, Naresh, 336
 Sankhya-Tarkatirtha, Kedar, 107

Sankhya-Vedantatirtha, Durga, 75, 81, 83, 105
Santan Sampradaya, 340
 Sanyal, Satya, 335; Subhendu, 37, 344, 357
 Saraswati, Sarasi, 57
 Sargent, John, 23, 63, 223
 Sarkar, Baneswar, 21, 58, 216, 337; Bejoy, 110, 132, 346; Bejollyal, 357; Benoy-Krishna, 335; Benoy, 29, 69, 81, 82, 107, 238, 255, 317, 320, 323, 330, 331, 337, 341, 356, 358, 360; Dhiren, 110, 132, 346; Dr., 318; Mrs. Ida, Preface; Miss Indira, Preface; Kailash, 83; Manmatha, 255; Nalini, 27, 29, 331; Nilratan, 43, 44, 86, 246, 255, 256, 310, 329, 330
 Sarvadikari, Deva, 43, 48, 77, 86, 329; Sudhis, 19; Sures, 85, 114
 Sathe, 319
 Schlappianoff, Mme, 321
 Schleicher, F. Major, Preface, 64, 322, 323
 Schleiter, 63
 Seal, Brajen, 43, 75, 87, 106; Sasanka, 188
 Sen, Adinath, 274; Sen and Co., 343; Baikuntha, 85, 114, 341; Bejoy, 340; Debi, 157; Dhiren, 28, 360; Dines, 107; Gopal, 62, 88, 89, 110, 111, 113, 246, 253; Gopal (junior), 216, 257, 334, 349, 354, 355; Hari, 336; Hem, 77; Hemen (poet and author), 255; Hemen (chemist), 125, 292; Mohit, 71, 108; Nalini, 210; Naren, 70, 86, 94, 103; Nares, 216, 332, 336; Pramatha, 86; Prasanna, 78, 87; Priya, 103; Rabi, 210; Ranjit, 355; Sasi, 353; Satchida, 349; Satis, 159; Satya, 286; Satyen, 157, 224, 225, 253, 334, 358; Shiva, Preface, 216, 238, 331, 337, 358; Suren, 103; Triguna, Preface, 28, 29, 36, 52, 60, 63, 222, 223, 251, 257, 287, 293, 319, 322, 323, 331, 333, 343, 348, 357, 358, 360
 Sen-Gupta, Amulya, 159; Biren, 133; Digin, 110; Jatin, 51, 53, 256; Kamal, 336; Kiran, 233; Kunja, 110, 335; Naren, Preface, 102-110, 130, 226, 346, 352; Nirmal, 188, 227; Sailaja, 334; Tarini, 103; Woomesh, 157
 Set, Jatin, 46, 49, 59, 66, 103, 110, 113, 132, 247, 251, 256, 317-319, 346, 351, 352, 354, 356, 358; Jogen, 341
 Sexton, Helen, 317
 Shah, E. A., Nadir, 318; Nandlal, 25, 226, 253, 335, 358, 360
 Sharma, K. R., 318
 Shaw, Ramprasad, 60; Shib, 342
 Shesasayee Bros. Ltd., 342
 Siemens-Martin, 197
 Singer, H. W., 196
 Singh, Deep, 90, 340; Indra, 61, 157, 344; Man, 318
 Singhania, Balabux, 60, 344
 Sinha, Arun, 85, 341; Chotay, 90, 340; Gopal, 32, 49, 341, 344; Himansu, 36, 257, 343, 355, 357; Satyen, 44, 90, 114
 Smith, Vincent, 107
 Sommerfeld, E., 52

Speal, G. 321
 Sree Narsingh Sahay Madan Gopal Co., 343
 Sriram, 64
 Suhrawardy, Sahid, 321
 Surajmalls, the, 286
Swadesh Hitaishini Sabha, 340
 Swaikas, the, 286
 Tagore, Abani, 90, 108; Gagan, 86, 90, 341; Mrs. Hemlata, 345; Jatindra, 69; Rabi, 43, 44, 45, 51, 71, 75, 84 104, 106, 108, 133, 227, 320; Samar, 90; Satyen, 43, 90, 104, 340
 Tarafdar, Sanat, 190
 Taraporewalla, J. A., 223, 318
 Tarkalankar, Chandra, 83
 Tarkaratna, Jadaveswar, 103
 Tarkavagish, Phani, 51 54, 235, 331
 Tata, 123, 138, 146, 157, 163, 189, 193, 210, 232, 269, 278, 286, 350, 351, Preface
 Thackersay, Vithaldas, 47
 Tikari, Maharaja, 90, 340
 Tilak (Bal-Gangadhar) 2, 45
 Tipperah, Maharaja, 90, 114
 Trivedi, Remendra, 43 46, 48, 75, 77, 78, 84, 106
 Tyson, G. W., 207
 Ukil, Ambika, 44, 75, 255; Amulya, 65, 227, 317, 358, 360; Arabinda, 361
 Vadgama, D. R., 256
 Vasubandhu, 56
 Venkataraman, K. 319
 Vidya-Vinod, Kshirod, 81, 82, 106
 Vidyapati, 108
 Vidyarthi, Narayan, 65, 158, 348, 358
 Vin, Ramesh, 360
 Viswanath, A, 318
 Visvesvaraya, M., 61
 Vivekananda, 71
 von Glasenapp, H., 52
 von Miller, Oskar, 54
 Vredenburg, E., 46, 87
 Wacha, D. E., 47
 Wagemann, 178
 Watson, F., 320
 Welling, Col., 63, 223
 Weston, A. T., 51
 Woolsey, 235
 Woytinsky, W., 144, 146
 Yusuf, Muhammad, 76, 83
 Ziegler, W. R., Col., Preface, 64, 321, 322, 323

WORKS OF PROF. BENOY SARKAR, Dr. h. c.

On National Education, Culture and Economy in World-Perspectives (in English)

1. *Economic Development*, Vol. I Pages 464. Rs. 8. Vol. II. Pages 320. Nine Charts. Rs. 6. (Demy). Madras and Calcutta (1926, 1932)
2. *Imperial Preference vis-à-vis World-Economy*. Pages 172. Fifteen Charts. Rs. 5. (Royal). Calcutta (1934)
3. *Indian Currency and Reserve Bank Problems*. Pages 94. Fourteen Charts. Rs. 3. (Royal). Calcutta (1932)
4. *Comparative Birth, Death and Growth Rates*. Pages 36. Nine Charts. Re. 1. (Folio Double-column). Rome and Calcutta (1931)
5. *The Sociology of Population*. Pages 150. Six Charts. Rs. 3. (Royal). Calcutta (1936)
6. *Social Insurance Legislation and Statistics*. Pages 470. Nine Charts. Rs. 8. (Demy). Calcutta (1936)
7. *The Political Philosophies Since 1905*. Vol. I. Pages 404. Rs. 4. (Double Crown). Vol. II. (Demy). Part I. Pages 356. Rs. 5. Part II. Pages 570. Rs. 12. Part III. Pages 368. Rs. 8. Madras and Lahore (1928, 1942)
8. *The Politics of Boundaries and Tendencies in International Relations*. Vol. I. Pages 340. Rs. 2-8-0. (Double Crown). Calcutta (1926)
9. *The Political Institutions and Theories of the Hindus*. Pages 270. Rs. 7. (Royal). Berlin and Calcutta (1922)
10. *The Sociology of Races, Cultures and Human Progress*. Pages 410. Rs. 7. (Royal). Originally known as *The Futurism of Young Asia*. Leipzig and Calcutta (1922)
11. *The Science of History and the Hope of Mankind*. Pages 80. Re. 1. (Demy). London and Madras (1912)
12. *Introduction to the Science of Education*. Pages 173. Re. 1-4-0 (Demy). London and Madras (1913)
13. *Comparative Pedagogics in Relation to Public Finance and National Wealth*. Pages 134. Re. 1. (Double Crown). Calcutta (1929)

14. *The Aesthetics of Young India*. Pages 124. Rs. 2. (Double Crown). Calcutta (1922)
15. *The Might of Man in the Social Philosophy of Ramakrishna and Vivekananda*. Pages 28. Four annas. (Double Crown). Calcutta and Madras (1936)
16. *Greetings to Young India*. Pages 190. Rs. 1. (Double Crown) Calcutta (1929)
17. *Chinese Religion through Hindu Eyes*. Pages 363. Rs. 8. (Demy). Shanghai (1916)
18. *Creative India*. Pages 725. Rs. 15. (Demy). Lahore (1937)
19. *Folk-Element in Hindu Culture*. Pages 330. Rs. 15. (Demy). London (1917)
20. *Hindu Art: Its Humanism and Modernism*. Pages 44. Rs. 2-8-0. (Double Crown). New York (1920)
21. *Hindu Achievements in Exact Science*. Pages 95. Rs. 3. (Double Crown). New York (1918)
22. *Love in Hindu Literature*. Pages 94. Rs. 2. (Demy). Tokyo (1916)
23. *Sukraniti* (English translation from the Sanskrit of Sukra's Politics, Economics and Sociology). Pages 300. Rs. 6. (Royal). Allahabad (1913)
24. *The Positive Background of Hindu Sociology*. Vol. I. *Introduction to Hindu Positivism*. Pages 770. Rs. 16. Vol. II. *Hindu Materialism and Natural Sciences* (second edition in the press). Pages 360. Vol. III. *Hindu Politics and Economics* (second edition in the press). Pages 240. (Royal). Allahabad (1914-37)
25. *Villages and Towns as Social Patterns*. Pages 704. Eight Charts. Rs. 15. (Royal). Calcutta (1941).
26. *The Equations of World Economy*. Pages 435. Four Charts. Rs. 12. (Royal). Calcutta (1943)
27. *Education for Industrialization*. An Analysis of the Forty Years' Work of Jadavpur College of Engineering and Technology (1905-45). Pages 400. Rs. 15. (Royal). Calcutta (1946).

Indian Currency and Reserve Bank Problems

Journal of the Royal Statistical Society (London): "The author has put forward with considerable force and statistical support the argument that the amount and Rupee value of India's exports (mainly agricultural) are not necessarily dependent on the rate of exchange."

Hindu (Madras): "On most questions Professor Sarkar's views are not identical with those held by prominent businessmen in the country. On every question he has attempted to substantiate his case by facts and figures. One fails to see how the businessmen can pick holes in Professor Sarkar's arguments."

People (Lahore): "Professor Sarkar is an optimist. The business community still continues to take a pessimistic view of the present rate of exchange. Many of us think that the continued export of gold must sooner or later bring the country to the verge of bankruptcy but Professor Sarkar knows more than any one else. Professor Sarkar approves of the Reserve Bank Bill and advises the business community to accept it."

Amrita Bazar Patrika (Calcutta): "Professor Sarkar is the founder of the present-day Bengali school of economics who support the linking of Rupee to sterling at 18d. per Re. and the exports of gold from India. The arguments adduced are well reasoned, interesting and educative."

Imperial Preference visavis World Economy

Economic Journal (London): "Sarkar is a vigorous as well as prolific writer and is not afraid of propounding views which run counter to those held by a large section of Indian politicians. The arguments are full and well-reasoned and are copiously illustrated by figures and charts."

Journal of the Royal Institute of International Affairs (London): "An ambitious attempt to elucidate the present chaotic condition of international economic relations, and to show the directions along which, in his opinion, these are developing. The chapters are valuable." (Prof. Coatman).

Economic Development

American Economic Review: "Professor Sarkar, a well known Indian scholar, endeavors to determine a proper economic policy for India. He concludes that the standards of living in Western Europe and the U.S.A. can be raised only to the extent of a simultaneous development in the industrially less developed countries (India, China, Balkans, South America, etc.)." (Prof. Bogart).

Allgemeines Statistisches Archiv (Jena): "He has been able to offer a judgment that is faultless both in theory and economic policy." (Prof. Henninger).

Weltwirtschaftliches Archiv (Jena): "Special significance is attached to the method of quantitative comparisons which Sarkar designates as comparative industrialism or comparative capitalism. Certainly the economic equations calculated by Sarkar give a clear picture of India's economic position in the perspective of the countries compared with." (Prof. Wehrle).

Professor André Siegfried (Paris): "In the chapters consecrated to capitalism in Bengal and rationalization in Indian industry are discussed the questions of mighty interest and I rejoice to study them under your direction."

Technik und Wirtschaft (Berlin): "Of considerable use even to critical European theorists and practical men. A most highly substantial work of the wellknown Indian scholar." (Prof. Hashagen).

Social Insurance Legislation and Statistics

Zeitschrift für die gesamte Versicherungswissenschaft: "Sarkar is one of the most valuable social and economic scientists of India and corresponding member of many European scientific institutes. During 1930 and 1931 he was a Visiting Professor at the Technological University of Munich. His book is a systematic exposition of social politics and social insurance with reference to the laws relating to this field obtaining in the leading countries of the world. This furnishes the book with its high charm and special value. It should be added that the entire treatment is rendered alive to our eyes through plentiful statistical data."

Annals of the American Academy of Political and Social Science: "Without questioning Marxian economics Sarkar stresses the fact that the mechanism of social insurance has been an outstanding factor in the building up of what he calls the "neo-capitalism" or the "second industrial revolution" which counteracts the evils of the first industrial revolution, the iron law of wages and the entire basic concept of socialistic economics. The development of social insurance is truly described as an attempt by society to protect itself against social risks which have been brought about by the industrial revolution. The book primarily written for India has value for the American student in its revealing economic facts in that populous nation." (Prof. A. Epstein).

American Sociological Review: "From a theoretical viewpoint

Sarkar's work is more interesting than the usual book on social insurance in general. The usefulness of the book is increased by the abundance of factual information carefully documented. Professor Sarkar has approached the subject of social insurance from a broad socio-economic viewpoint." (Prof. R. Clyde White).

The Sociology of Races, Cultures and Human Progress

Annals of the American Academy of Political and Social Science : "It is aimed against the the cultural chauvinism among scientists and philosophers of the West in regard to the East. It holds that this minimizing of the Orient was engendered by the political enslavement of Asia by Eur-America." (Prof. M. T. Price).

Manchester Guardian : "An introductory essay and five astonishing monographs."

American Political Science Review : "The wide range of subjects intelligently discussed reveals evidence of unusual versatility on the part of the author." (Prof. Garner).

American Sociological Review : "The greatest value of the book lies in the explanation it offers of the national ideals of China and India. It presents what appears to be a thorough appraisal. Dr. Sarkar strongly objects, and somewhat justifiably so, to the picture of 'backward Asia' drawn by Western writers." (Prof. Chakerian).

Sociology and Social Research (Los Angeles, U.S.A.): "The main thesis of the book is challenging and worthy of careful thought."

Sozialwissenschaftliches Literaturblatt (Berlin) : "Professor Sarkar reminds us in many ways of our Oswald Spengler on account of startlingly manysided erudition and intellectual flexibility with which this scholarship traverses in a powerful manner all the regions and epochs of human culture. The book exhibits plenty of learning combined with restraint of temperament."

Villages and Towns as Social Patterns

Man (Royal Anthropological Institute, London) : "It is thoughtful and suggestive and worthy of attention by those who are interested in sociological method as well as by those who are specially concerned with India. Sarkar's position is that while one group may lag behind another in certain respects there should be no distinction between *sociologie* and *sociologie coloniale*. He will have nothing to do with the false dichotomies of East and West,

country and town. He scorns Spengler's ideal peasant as a figment of wishful thinking. He also objects to all the philosophers, theologians and sociologists who frame some scheme or other that pretends to be a final consummation. Sarkar's essay has value in its insistence that change and struggle are likely to go on unceasingly.

"Sarkar attempts to discuss sociology in general, and writes with special illustrations from Indian conditions, though also with considerable knowledge of Euramerican life." (Prof. H. J. Fleure).

Ethics (University of Chicago): "The volume under review is in some respects cosmic in scope. Here erudition and rich stores of information are interspersed with brilliant insights which the student in the social sciences may profitably explore. The factual illustrations and statistical data are from India, and the concrete examples from the American, English, French, German, Italian, Japanese and Russian scene." (Professor S. M. Strong).

American Sociological Review: "I am glad to commend his statement on the Scope of Sociology in Relation to Rural-Urban Studies. He draws a sharp distinction between sociology as the 'analysis of sociations' and what is commonly called applied sociology. I am making the same distinction between rural sociology and rural social organization in a book by that title to be published the coming summer (1942). Sarkar describes his book very well when he says: "In this study villages and towns have been used as pegs on which to hang the topics relating to sociations." It deals primarily with the socio-economics of rural life, in terms of its improvement by various urban institutions, such as those of health, nutrition, etc. His recurring thesis is that there is no fundamental difference between the village and the city in patterns or processes of sociation except in quantity. His whole argument is that progress in rural life will come from its urbanization. Interspersed are long sections on all sorts of problems from feminism to the Russian soviet regime and Indian political ideologies. Those who are interested in Indian social philosophy may find material of value in the book." (Prof. D. Sanderson).

The Equations of World Economy

Economic Journal (London): "This, like all of Sarkar's work, breaks right away from traditional patterns of economic writing, and tries to develop an original technique for the problems in hand.

He seeks here to examine the limitations and possibilities for the expansion of Indian economy. He lays down a curve of progress:

India (1885)=England (1800-15)=Germany (1848).

India (1905)=England (1815-30)=Germany (1850-60).

India (1940)=England (1830-48)=Germany (1865-70).

He then goes on to ask how far technical, political and economic trends are opening or closing the lag of India on European industries, and what is the outlook for the future."

Commerce (Bombay): "At a time when the United Nations are devoting increasing attention to the important problem of winning the peace, the book under reference should be of more than economic importance. It provides the reader with a faithful and intelligent analysis of the economic data and their comparison, and the topics discussed in each chapter are diverse as well as the regions."

Capital (Calcutta): "The student of the social sciences will find much food for thought in the pages of this challenging treatise. Dr. Sarkar lives in a pluralistic world, and in his ideology there is no single pattern of world-economy or world-order. The author envisages minors, majors and adults in industrial and technocratic development and fixes a time-lag between the successive categories. His categories and time-lags are not immutable but the basic structure of his patterns cannot be eliminated or merged into one world-system. According to Prof. Sarkar, no reconstruction can possibly realize the ideals, vaguely enunciated and utopian so far, of worldwide economic salvation."

Amrita Bazar Patrika (Calcutta): "Hitherto studies on Indian economics have been mainly of a descriptive or historical character, and in many cases their values have been impaired by political bias from which we undeniably suffer. It is refreshing, therefore, to note in this work the application of a new methodology. No other countryman of ours commands such wide knowledge of comparative industrialism and technocracy as Dr. Sarkar."

Sarkarism

By Subodh Krishna Ghoshal, M. A.

60 pages (Royal). Re 1.

International Affairs (Journal of the Royal Institute of International Affairs, London): "In his brochure on the ideas and ideals of

Benoy Sarkar, Mr. Ghoshal does not claim to do more than indicate the guiding principles of Sarkarism on a variety of subjects. In the political sphere Sarkar holds the view that independence and sovereignty are limited as a matter of course. He rejects the romantic soul-theory of nationality of which Hitler is the latest exponent, and regards the state as a mechanical conglomeration of domestic, units, clan-communities, socio-economic units, etc., not dependent on race, language or culture. There are many ideas here which deserve consideration by those who are thinking of a future international organization."

Pragmatism and Pioneering in Benoy Sarkar's Sociology and Economics

By Nagendra Nath Chaudhury, M. A. (Chicago)

Pages 152 (Royal). Rs. 3.

Economic Journal (London): "The latest addition to the rapidly increasing literature dealing with the thought and writings of Benoy Sarkar contains one chapter dealing with his economic work. His main contribution to the development of economic thinking in India is a more scientific approach, coupled with a careful study of the application of the methods and means developed elsewhere to the social and economic problems of India."

Man (Royal Anthropological Institute, London): "This is a flamboyant eulogy of an Indian economist whose voluminous writings seem to have considerable influence in Bengal. Benoy Sarkar was born in 1887 and grew up during the Swadeshi movement of 1905 when he refused a travelling scholarship to England to devote himself to his mother-country. Later he retrieved that step by spending many years in foreign travel, and which has enabled him to see Indian affairs in their relation to those of other peoples and to estimate the degree of lag between their present phases of advancement. He has founded institutions for teaching and for research, and gathered a band of associates working on similar lines including the writer of this sketch of his work. Extracts from his speeches and writings and from critical reviews of his books contribute to the impression of him as a learned, prolific and independent thinker inclined to move far ahead of those who he is trying to benefit and enlighten, but impressed by the need for knowledge, scholarship and

patience in dealing with the economic problems of his country.' (Prof. Sir J. L. Myres).

Conflicting Tendencies in Indian Economic Thought

By Shib Chandra Dutt, M.A., B.L.

Pages 234 (Royal). Rs. 5

✓ *Economic Journal* (London): "Though Mr. Dutt is obviously in sympathy with the modernist views of Professor Sarkar he has, so far as we can judge, furnished a fair presentation of the doctrines enunciated by Mahatma Gandhi."

Professor P. T. Homan (Cornell University, U. S. A.): "I was specially glad to see an extended treatment of Sarkar's writings. I was of course aware of the tendencies, but had never before run on to any clear statement and contrast of them."

The Social and Economic Ideas of Benoy Sarkar

Edited by Professor Banesvar Dass, B. S. Ch. E. (Illinois)

Pages 690 (Royal). Rs. 12

Aryan Path (Bombay): "The book is a fitting tribute to one of the foremost living thinkers of India and builders of Bengal. There is no Indian intellectual who has not read one or another of the countless writings of this savant. His versatility is indeed as amazing as his grasp of facts is intimate."

✓ Professor F. Hankins, President, American Sociological Society: "Sarkar represents a fine amalgam of East and West both in his marvelous understanding of the spirit and institutions of European culture and in the all-embracing humanism of his moral and spiritual outlook. He is a fine prototype of what we all hope the world will eventually achieve in the human personality and mutual understanding, the true citizen of the world."

Journal of the Madras University: "As Dr. N. N. Law points out in his Foreword, in order to understand Professor Sarkar as a man and get his ideas in the most concise form one would naturally begin the book with *The Seven Creeds of Benoy Sarkar* by Mrs. Ida Sarkar."

Prof. P. F. Cressey, Eastern Sociological Society (Massachusetts, U.S.A.): "The work is a valuable compendium of the brilliant and scholarly writing of Professor Sarkar. One is impressed by the breadth of his knowledge and the accuracy of his scholarship. His extensive travels in Europe and America enabled him to understand many aspects of Indian culture in relation to a world-setting. This summary of his writing should be of value to American scholars interested in obtaining a better understanding of India and its place in the modern world."

Annals of the American Academy of Political and Social Science: "An embodiment of the almost legendary versatility of the Bengali intellectual, Professor Benoy Sarkar, ranges over fields not only in economics and sociology but also in political science, philosophy, religion, art, history and education. Virtually every contribution of Sarkar is based on comparative surveys and international investigations. He stresses the capacities of Indians for material progress and the capacities of Occidentals for mystic and metaphysical achievements. He favours an international policy for India which will supply her with foreign capital needed for her industrialization. India's poverty is no indication of overpopulation in Sarkar's mind, and he issues no call for birth control. The blood of the lower castes is replacing that of the upper; and rather than cut down the populace of a people heading again for world-embracing leadership in culture, he seems content to wait for industrialization. Gandhi's handicraft program he rejects as onesided and utterly inadequate. Such considerations should not deter the openminded among Occidentals from getting acquainted with the thoughts of wide-ranging Orientals like Benoy Sarkar, and from being prodded out of some of our smug ethnocentric Occidentalism and into stimulating Oriental viewpoints." (Prof. M. T. Price)

For these and other works (in Bengali and English) by or about Sarkar inquiries may be made of Messrs. Chakraverty Chatterjee & Co. Ltd., 15 College Square, Calcutta.

